# ELECTRICAL REVIEW

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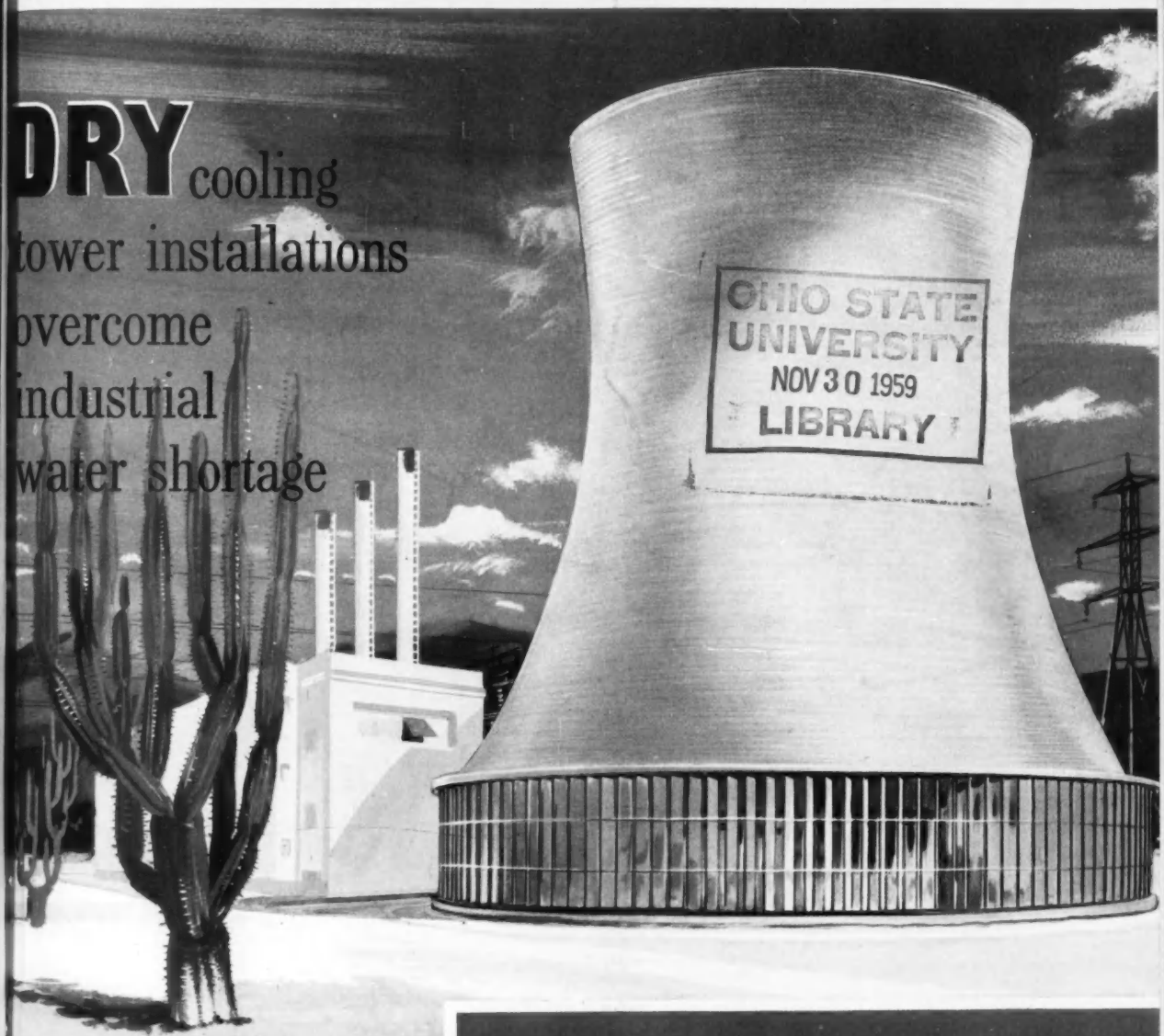


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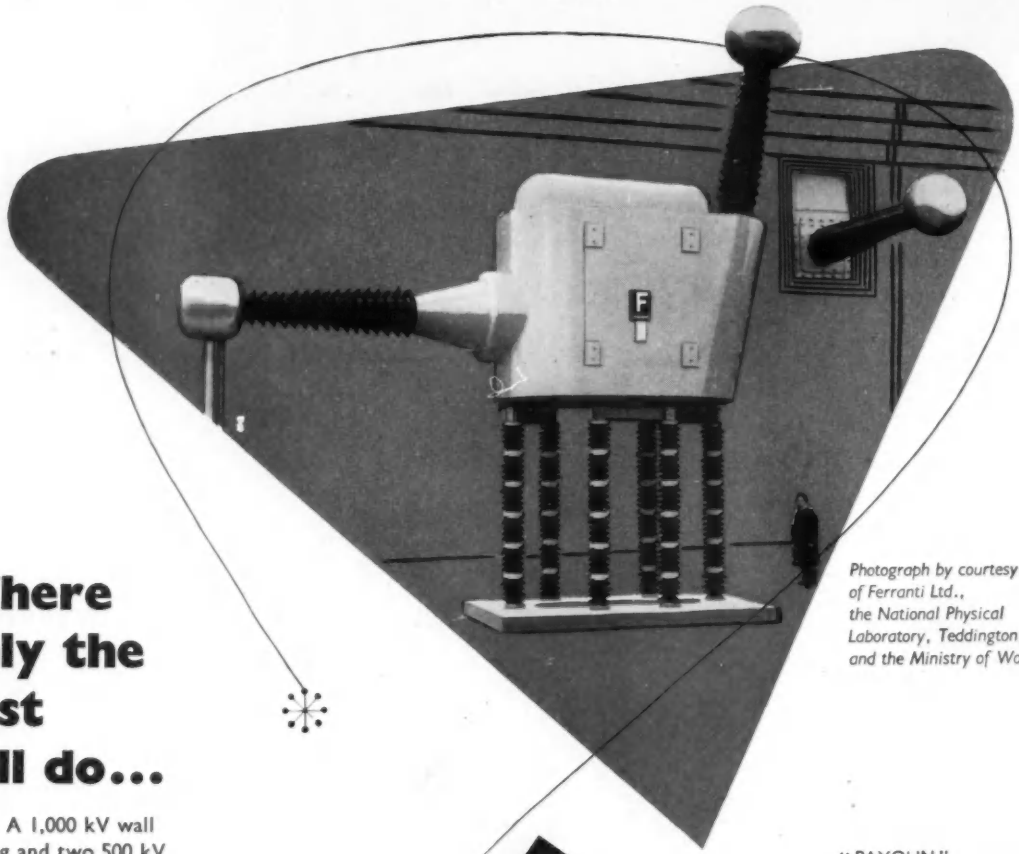

*Photograph by courtesy of Ferranti Ltd., the National Physical Laboratory, Teddington, and the Ministry of Works.*

# Where only the best will do...

(ABOVE) A 1,000 kV wall bushing and two 500 kV transformer bushings manufactured by M. & I. and installed in testing equipment at the National Physical Laboratory, Teddington, under the direction of the Ministry of Works.

(RIGHT) Amino glass "PAXOLIN" used in remote control gear assembly.

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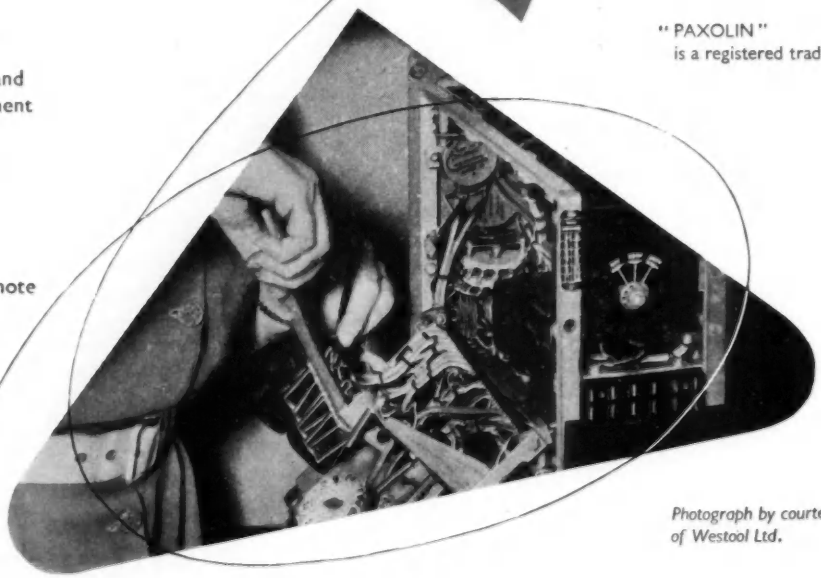

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ELECTRICAL REVIEW

6 November 1959 Vol. 165 No. 13 Established 1872

# Shop Lighting Opportunities

ALTHOUGH there is tremendous scope throughout the whole field of illumination in this country it is possible that the greatest opportunities exist in the commercial field. Industrialists generally are forced to install good lighting because they are aware of the direct relationship between lighting and production, although it is true that there are deficiencies. On the other hand shop- and store-keepers do not appreciate to the same degree the fact that this relationship exists in their case too—that better lighting means greater output, i.e. sales. This is not to say that little progress has been made. Those with pre-war memories are fully aware how greatly the standard has been raised and how much the night appearance of our towns has been improved by the extending use of after-hours shop lighting.

All the same the improvement has not been general and there is still a colossal amount of work to be secured by the industry. Perhaps the reason why even greater progress has not been made is that electrical contractors (and this term covers the Electricity Boards' contracting departments) have not been active enough. First, of course, they should begin at home. Cobblers' children are traditionally the worst shod, and the appearance of some contractors' premises is a poor background to their pressure upon shopkeepers to improve their illumination. There is a great deal of force in example: not only should contractors' own shops and showrooms reach a high standard, but shopkeepers should be constantly made aware of what more enlightened members of their class are doing.

One erroneous idea which often has to be scotched is that plenty of light is all that is needed, rather than a well-planned installation. In this direction, particularly, there is much to be done, but success can be achieved only if the contractor himself is properly acquainted with the needs and the methods. For large installations, no doubt, lighting specialists will be engaged, but in most cases the customer will depend solely upon the contractor. As a rule, the contractor cannot be expected to be an illuminating engineer, but he should at least be acquainted with the elements of lighting design. In this he will be greatly helped by the brochure which the British Lighting Council has just produced, a review of which appears on page 599. The advice given, with illustrated notes on good examples of shop lighting, is easily assimilated and can be supplemented by other assistance from the Council through its eight regional offices covering the areas of the English and Scottish Electricity Boards.

## NUCLEAR POWER DELAYS

During our recent inspection of the nuclear power station which is being erected at Bradwell, Essex, we were told that the work was about six months behind schedule, mainly as a result of unofficial strikes. At the Hunterston station of the South of Scotland Electricity Board one of the members of the consortium responsible for the station was recently compelled to suspend operations because of repeated stoppages by men engaged on all-important welding work. In this case completion has been deferred for nearly a year, there having been considerable initial delay on account of a dispute about the site.

These delays are extremely damaging to this country's prestige and prospects. From the beginning it has been the hope that the erection and operation of these large-scale stations will place us in a very favourable position with other nations who are contemplating nuclear power systems. It is to be hoped that the steps which are contemplated by the Trades Union Congress and the individual unions concerned to bring to an end these too-frequent stoppages will have early results.

## HYDRO-ELECTRIC DESIGN

The potential of a hydro-electric scheme can usually be used either for base-load or peak-load generation. The difference in capital cost for a water-power undertaking intended for peak-load generation compared with that of a base-load plant is smaller than the equivalent cost increase in the case of coal-fired power stations. A hydro scheme is, therefore, usually designed for low load factors. The Shin scheme of the North of Scotland Hydro-Electric Board (see next page) has been designed for an overall load factor of about 44 per cent and its total output is sufficient to meet the present electrical load of the Scottish mainland north of Great Glen.

The Shin scheme provides yet another example of the progressive attitude of the N.S.H.E.B. The Board is always ready to put into practice the latest developments in hydro-electric and associated transmission and distribution technique. In this case, a horizontal propeller type turbine of unconventional design has been installed at one of the power stations in the group.

## RURAL ELECTRIFICATION

The steady progress being made with the introduction of electricity supplies in rural areas receives little publicity in comparison with the development of the country's generation facilities, but that it is taking place is evident from the recent ceremony at Grove Hill Farm, Buckingham, when a supply was switched on to the East Midlands Electricity Board's 25,000th farm. Rural electrification is undoubtedly one of the most rewarding forms of electrical progress, for a minor industrial revolution has been taking place in agriculture and the view has been expressed that it would be impossible to use modern farming techniques without an adequate electricity supply.

Ultimately the extension of distribution networks will virtually cease as all but the most outlying farms become connected. It is expected that 95 per cent of the potential farm consumers will be supplied by 1963 and work is well ahead of schedule in some areas, the E.M.E.B. already having over 91 per cent connected. There will, however, still be opportunities in the rural electrification field in introducing new applications of electricity and increasing the average farm consumption from the present figure of 8,000 kWh per year. This will in some degree occur automatically as the benefits to be obtained from electrification become fully appreciated and as capital becomes available for new equipment. It must be remembered that many farms are carrying out operations ideally suited to electrification but are using alternative machinery that has not yet reached the end of its economic life and in these cases changeovers to electrical methods are inevitably delayed.

## MORE INSTRUMENTS REQUIRED

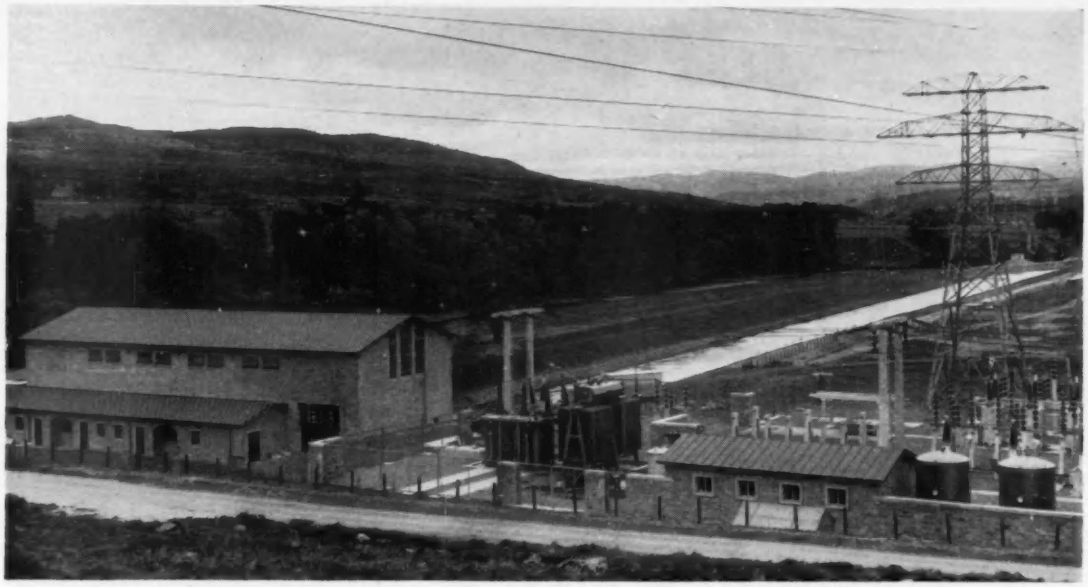
One would imagine that in view of all the advances which have been made during recent years in connection with electronics, semiconductor devices, automatic controls and so forth, instruments and measuring equipment were readily available to cater for almost every conceivable requirement. This was shown to be far from the case at the recent convention at Brighton of the Scientific Instrument Manufacturers' Association. For instance, in the medical field the anæsthetist is almost devoid of instrumentation. It is only within the last few weeks that the first fast gas analysis machine has become available. Another recent development is an instrument for measuring blood pressure (systolic) without the use of an intravenous pressure transducer. It would be most useful if a similar instrument for measuring diastolic pressure could be developed.

There is no doubt from what was said at Brighton that the British medical profession is under-instrumented and one of the contributory causes of this state of affairs is the lack of contact between the instrument manufacturers and the doctors who use their products. A great deal of good therefore is likely to be done by the Medical Biological Engineering Society which is to be formed to provide a common meeting ground for doctors and engineers.

## BOILER FEEDWATER

The trend towards higher pressures in steam raising introduces or exaggerates existing problems related to corrosion of and deposits within the water passages of boilers. These problems appear to become more acute above 1,500 lb/sq in. Although the paper by Mr. P. Hamer reviewed on page 598 is mainly concerned with boilers in general industry where the percentage of make-up feedwater may be high, as when steam is required for process work, the author's careful study of the subject lends to it a wider general interest.

Much remains to be done before the conditions necessary to prevent corrosion can be defined with certainty. A reference in the paper to relevant experiments being conducted by the Central Electricity Generating Board with a specially designed pilot boiler seems to indicate that even with the comparatively small amounts of make-up required in conventional power stations further investigations in this field are desirable; still more are they in regard to nuclear stations.



*Shin power station with tailrace, and River Shin at the foot of the trees*

# SHIN — 38 MW Project Nearing Completion

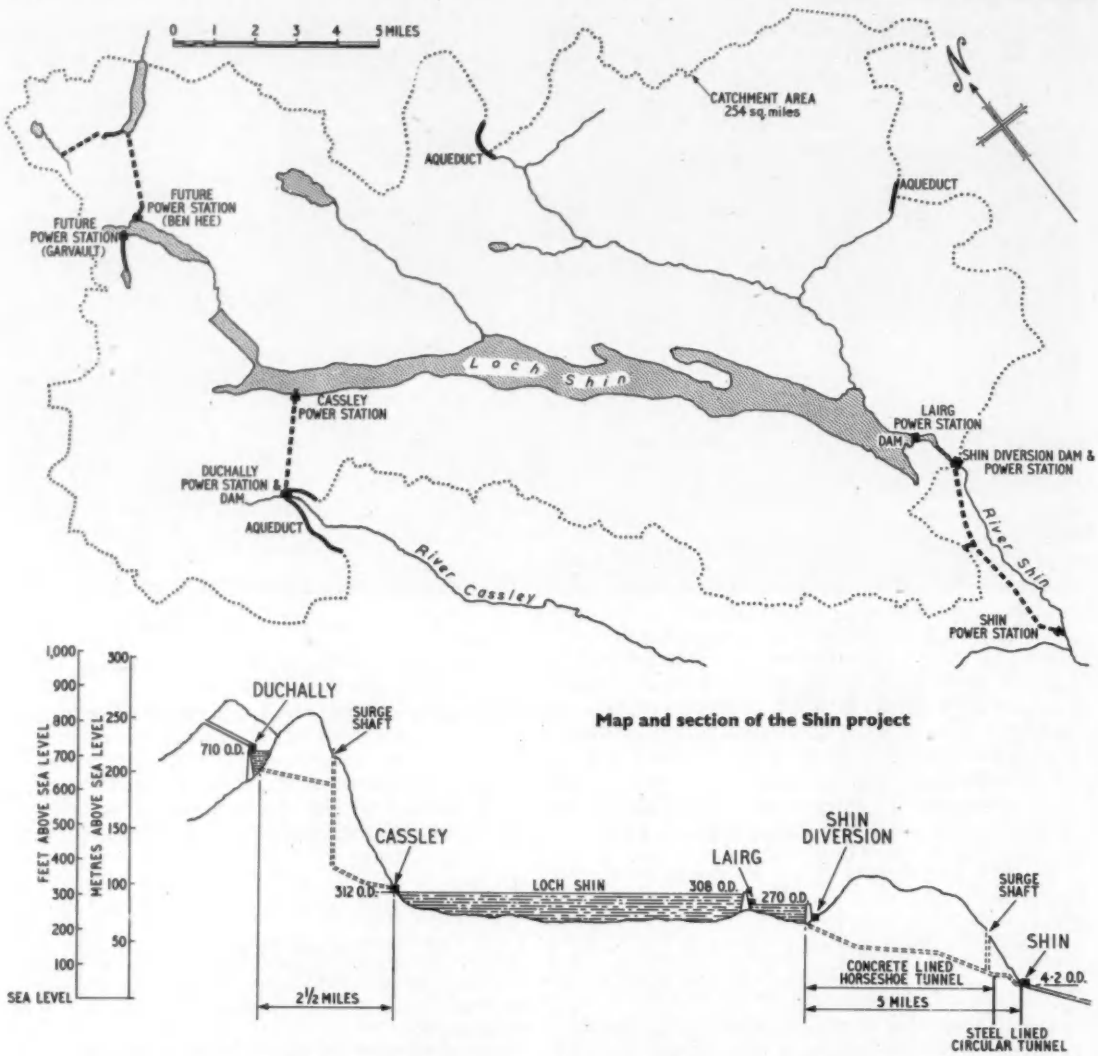
**This scheme consists of five power stations and three dams with a catchment area of 254 sq miles. A group control centre is located in Shin power station and a horizontal propeller type turbine has been installed at the Shin diversion station**

THE Shin project of the North of Scotland Hydro-Electric Board consists of three main power stations, namely, Cassley (10 MW), Lairg (3·5 MW) and Shin (24 MW), with a total catchment area of 254 sq miles. Loch Shin is in mid-Sutherland.

The Cassley works involve the diversion of mountain streams by two aqueducts to a small power station at Duchally, which discharges into a small headpond formed by a dam across the River Cassley. This water is then led by a 2½-mile-long tunnel to Cassley generating station, near the head of Loch Shin. At the southern end of the loch, Lairg dam raises the water level by some 37ft. Lairg power station is incorporated in this dam and the water discharged from the station passes into the River Shin. Parts of the lochside road have been diverted and an embankment has been built by the side of the main road in Lairg to prevent flooding. About a mile downstream from Lairg, a diversion dam has been built across the River Shin which incorporates a small compensation-water tubular turbine/generator. From here, water is taken by a five-mile-long tunnel to Shin generating station close to the River Shin at Inveran. The discharge from Shin power station rejoins the River Shin at this point. There are two projects for future development at the northern end of the catchment area, the Ben Hee and Garvault schemes shown on the map of the whole system on page 588.

Construction of the scheme began in 1954 and the first set in Shin power station was brought into commercial service in December, 1958, while Lairg commenced generating in January this year. Cassley power station is under construction and commissioning is planned for the end of this year. The total capacity of the present

*Duchally dam, which provides a forebay for Cassley*




**Map and section of the Shin project**

scheme is 38 MW. With an average rainfall of 55·7in, Shin and Lairg power stations will operate at a 49 per cent load factor, while Cassley will operate at 28 per cent. The Lairg and Shin power stations will have a total annual output of 113 million kWh, while Cassley will produce 24 million kWh per annum. This total of 137 million kWh per annum is sufficient to supply the present electrical load of the Scottish mainland north of the Great Glen.

*Cassley power station under construction*

## Cassley Section

At Duchally, a two-mile-long aqueduct has been built to carry water to a Gilbert Gilkes Francis turbine which will be directly coupled to a Bruce Peebles 325 kW induction generator running at 760 r.p.m. Another aqueduct, a mile long, will supply a Gilbert Gilkes Turgo impulse turbine directly coupled to a Bruce Peebles 125 kW, 610 r.p.m. induction generator. Both sets will generate at 415 V and will be arranged for manual start. They will discharge into a small headpond, held back by a 28ft dam. Water from this pond, including that of the River Cassley itself, will be carried to Cassley power station by a 2½-mile-long tunnel. About ten miles of new road have been built to reach Duchally and Cassley from the public highway.

As there is very small storage capacity at Duchally, Cassley can be considered as a run-of-river station. It

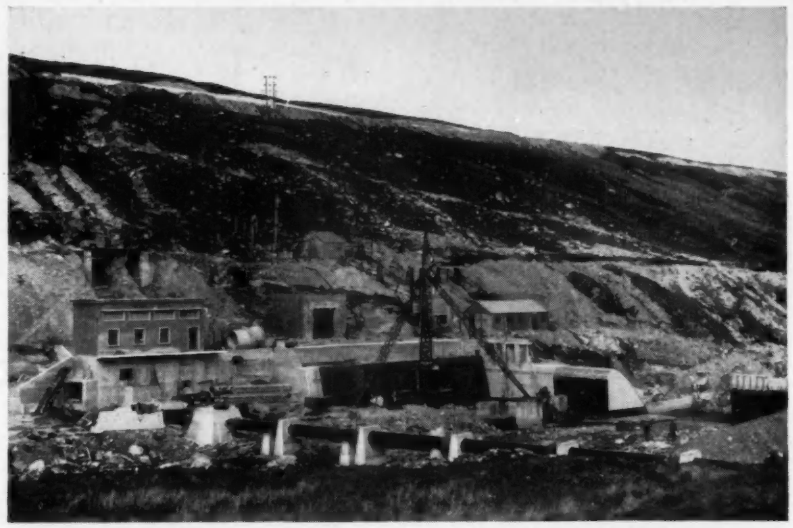
will contain one 7·5 MW and one 2·5 MW horizontal Francis turbo-alternators made by Harland Engineering, operating under a gross head of 398ft. These sets will be manually started, but loading will be by water level control.

## Lairg Dam

The dam at Lairg is constructed across a natural restriction at the south-eastern end of Loch Shin. Of concrete construction, with embankment flanks, it is 1,400ft long, will raise the level of the loch by 37ft and will give a total storage capacity of about 11,350 million cu ft. Construction of the dam commenced in 1954 and was completed in 30 months. It involved the placing of 45,000 cu yd of concrete besides the necessary excavations.

Incorporated in the structure of this dam is Lairg power station and a Borland fish lift. The power station contains a single vertical Boving Kaplan unit with a rated output of 4,930 h.p. at 167 r.p.m. at a mean net head of 32ft. The vertical shaft salient pole synchronous generator, supplied by Bruce Peebles, has a rated output of 3·5 MW at 0·85 power factor and 3·3 kV. Its 29 ton umbrella type rotor has a diameter of 19ft and the 25 ton stator was transported to site in two sections.

The station is equipped for manual starting and load control with provision for future supervisory control and automatic load control. The controls are mounted on a suite of panels which is situated adjacent to the machine and the station alarms are grouped and relayed to the Shin power station control room.

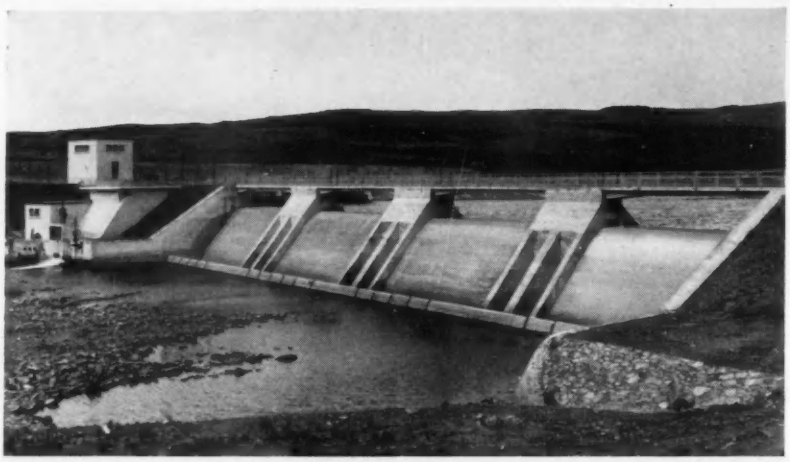


*Duchally, showing the power station (right), Cassley intake screens (centre) and dam (left). The pipeline in the foreground supplies the 325 kW machine, while the aqueduct near the top of the hill supplies the 125 kW machine*

## Shin Diversion

The Shin diversion dam has been constructed a mile below Lairg dam and creates a headpond for the operation of Shin power station. The main flow of water is directed by a tunnel to Shin and, to make use of the compensation water which must be provided for the River Shin, a small power station has been constructed in the dam. This dam also incorporates a Borland fish lift and screens to prevent fish and debris from entering

*Aqueduct supplying Duchally power station (left). When Duchally is shut down, the aqueduct discharges into the headpond*



*Shin diversion dam. The power station is built into the dam structure (lower left) and the gate house for the Shin tunnel is above the dam on the bank (left)*

the tunnel. An electronic counter, designed by the N.S.H.E.B., is provided at the upstream end of the fish lift. It is operated by the change in resistance caused by a fish passing through three copper bands in a pipe in the gate and can discriminate between different sizes of fish and between ascending and descending fish.

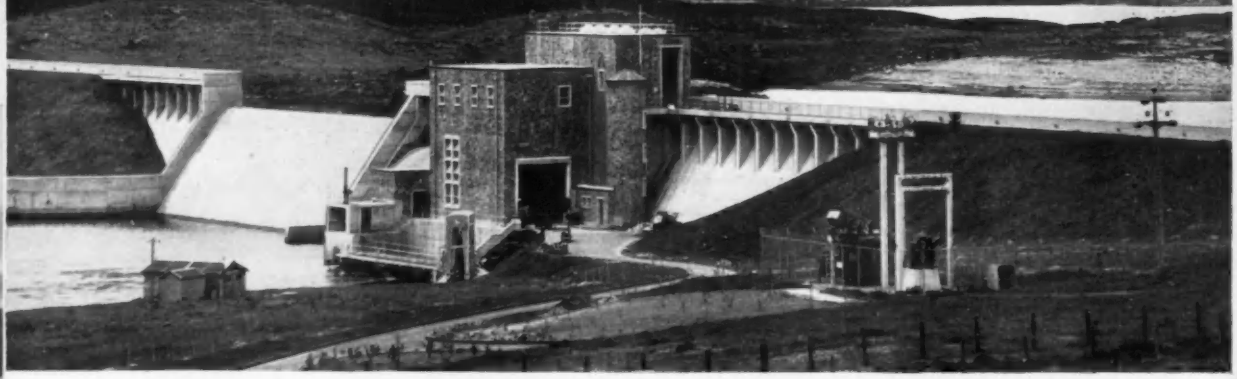
The Boving turbine at the Shin diversion dam is a horizontal propeller unit having blades which can be adjusted manually to suit different conditions of flow. It is rated at 145 h.p. at 434 r.p.m. with a mean net head of 17·5ft. This turbine is of particular interest because it is enclosed in a casing of tubular form and is one of the first of this type in the country. The Bruce Peebles induction generator is mounted externally and is driven by a horizontal shaft which passes through a gland on the draught tube bend. The generator has a rated output of 100 kW at 0·76 power factor and 415 V. The station is manually controlled but an alarm associated with shut-down under fault conditions is relayed back to Shin power station. An automatic sluice valve will be installed to maintain the river flow in the event of a shut-down on fault.

## Shin Tunnel

The five-mile Shin tunnel between the diversion dam and Shin power station formed a major part of the Wimpey contract. It was completed in 23 months, the last eight months being occupied by lining the tunnel. The rate of driving reached as much as 242ft a week, all of the driving being through solid rock. The concrete-lined tunnel is a horseshoe-shaped section 16ft high and 13ft wide at its maximum. An adit was driven into the lining of the tunnel two miles down from the intake, so that the tunnelling was carried out on four faces at once. The shuttering for the concrete lining of the tunnel consisted of a rail-mounted frame carrying a series of fifteen 20ft telescopic steel sections.

While the tunnel was being driven, the diversion dam and the surge shaft, 200ft deep and 45ft in diameter, were constructed. The surge shaft is situated at the lower end

*A view of the Lairg dam and 3·5 MW single-set power station*



of the tunnel, after which the water is led through a 13ft 6in diameter steel-lined pressure tunnel 1,700ft long into Shin power station via twin 9ft diameter steel pipes to feed the two 12 MW turbine/generators. When running at full load, the flow passing through the tunnel reaches 1,400 cu ft/sec. Beyond Shin power station there is a 1,900ft tailrace which takes the spent water to rejoin the River Shin some six miles below the dam.

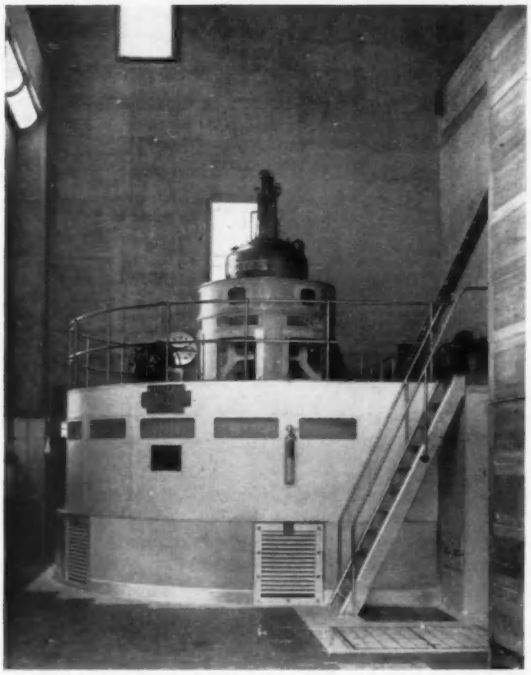
## Shin Power Station

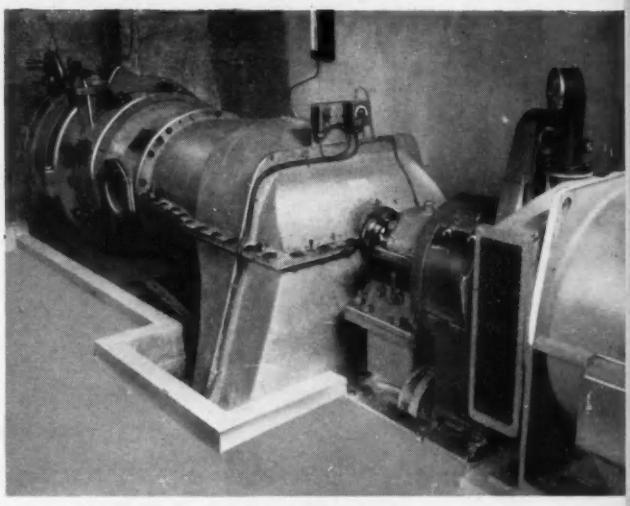
Each of the two identical Boving turbine/generators at Shin power station has a rated output of 16,600 h.p. at 375 r.p.m. with a net head of 250ft. The inlet water to each of the horizontal Francis units is controlled by a rotary valve. To protect the spiral casing and inlet pipe from excessive pressure rise in the event of sudden load rejection, a relief valve is fitted to each turbine.

Both of the horizontal Bruce Peebles salient pole synchronous generators have a rated output of 12 MW at 0·85 power factor and 11 kV and will produce 103 million kWh/annum. As at Lairg, open-circuit air cooling is employed, warm air being exhausted into the turbine hall. However, at Shin, the air is drawn in from outside the buildings through filters and facilities are provided for mixing the turbine hall air and outside air at the inlet and for recirculating to cover extreme wintry conditions.

The turbines can be controlled from the turbine gauge panels in the turbine hall and the generator control desk in the control room. Control of the generators, however, including synchronising and the switchgear, is available only at the control desk. Manual synchronising is employed but a check-synchronising relay is available which will prevent closure of the switch unless the phase relationship is correct. An interesting feature in the control room is the panoramic view of the whole Shin scheme on the hydraulic panel. This control room acts as a group control centre for the complete project, and

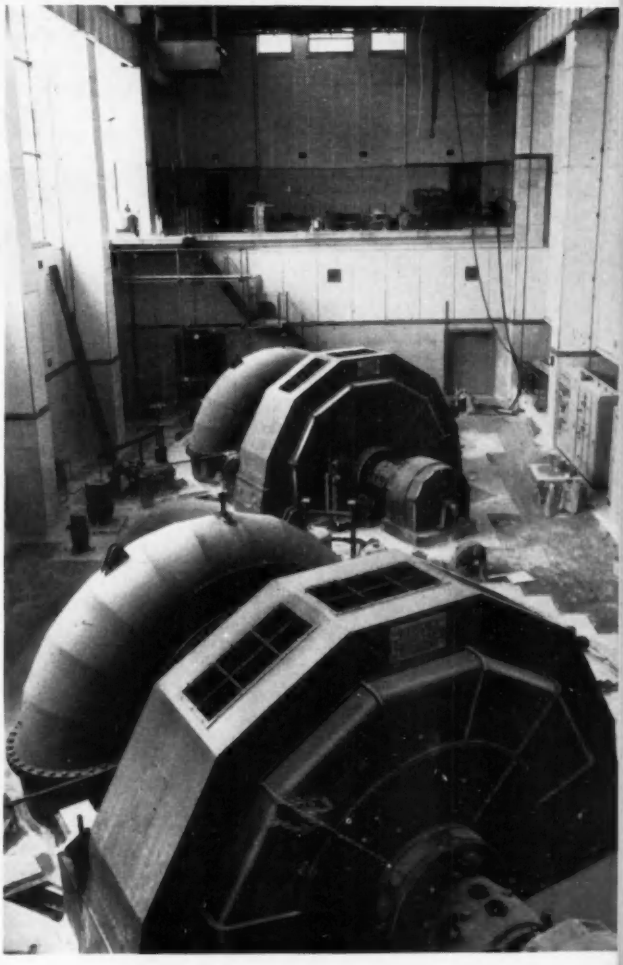
*The 3·5 MW Kaplan unit in Lairg power station*

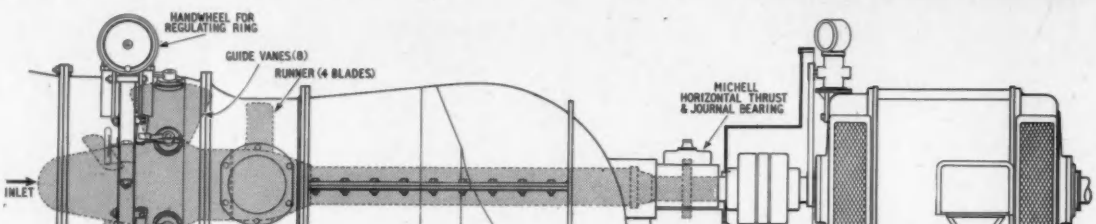




*The 100 kW tubular turbine in Shin diversion power station*

*The two 12 MW horizontal Francis machines in Shin power station*






*Section through the tubular turbine*

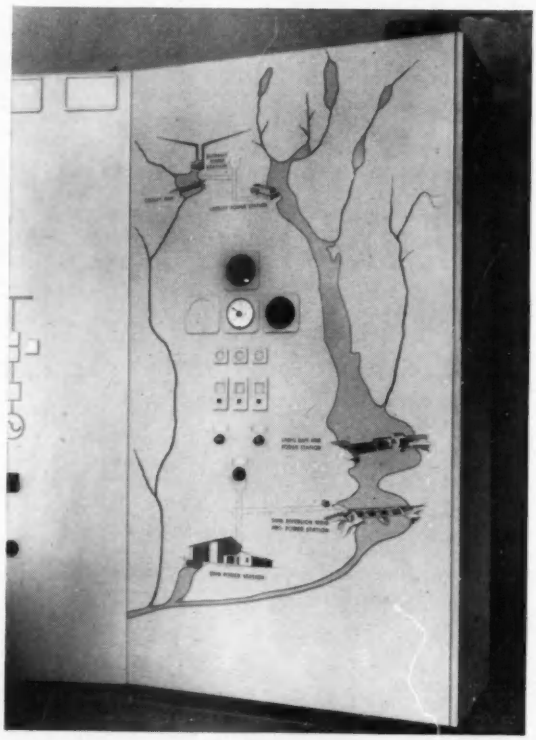
loading instructions are telephoned to the other stations within the group by the control engineer. Group loading instructions are received from the N.S.H.E.B.'s main control centre at Port-na-Craig, near Pitlochry.

An electric fish screen, designed by the N.S.H.E.B., is installed at the head of the tailrace to prevent fish swimming up the tailrace and to divert them up the River Shin. The screen consists of a number of electrodes in the water pulsed at 400 V every ten seconds, the supply being clear of "earth." A fish pass has also been built in case of a failure of the electric screens.

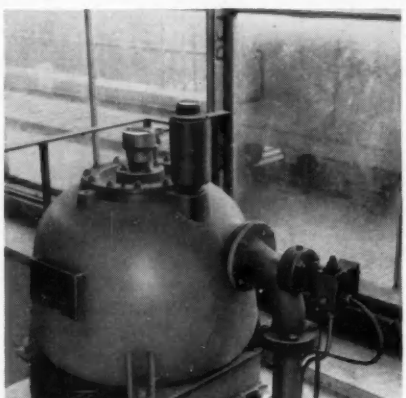
An outdoor 132 kV switching station is situated adjacent to Shin power station with double-circuit connections to Beauly (single-strung) and Mybster, a single-circuit connection to Cassley with a tee-off at Lairg, plus one main 25 MVA, 132/11 kV Bruce Peebles transformer circuit connected to the 11 kV busbar in Shin power station. The main transformer is provided with a 150 kVA earthing transformer and a 7·95 Ω earthing resistance on the l.v. site. It is equipped with differential, overcurrent and earth fault protection. The earthing transformer provides the standby supply for the station auxiliaries, while the normal supply is obtained from a 33 kV connection from Lairg. The 132 kV switchgear comprises five Ferguson Pailin 1,500 MVA, XOP60 bulk oil circuit-breakers. The Reyrolle 11 kV switchgear in Shin power station consists of a three-panel board of 500 MVA horizontal drawout type B5T oil circuit-breakers.

At Lairg, an outdoor 33 kV substation is situated adjacent to the tapping point on the 132 kV line from Shin. The connection to the 132 kV system is via a 7·5 MVA, 33/132 kV transformer. The 33 kV switchgear comprises three Switchgear & Cowans type K1 circuit-breakers. No 132 kV circuit-breaker is provided and remote line disconnection is by means of a fault-throwing switch.

The unit at Lairg power station is connected via a



*Close-up of the diagrammatic hydraulic panel in the Shin group control centre*



*Boving Pelton wheel which is used to drive the emergency governor oil pump in Shin power station*

3·3 kV, 150 MVA, 800 A Reyrolle air circuit-breaker to a 4 MVA Bruce Peebles 3·3/33 kV transformer, which is in turn connected to the substation by one mile of 33 kV overhead lines. The 33 kV substation, which is controlled from Lairg power station, also includes a 1 MVA, 33/11 kV transformer for local distribution and two 33 kV feeders to Golspie and Shin, the latter picking up the power from the Shin diversion dam power station.

A substation has been built at the termination of the 132 kV line about four miles from Cassley. It contains a 10 MVA Bruce Peebles 132/33 kV transformer and three 33 kV Switchgear & Cowans circuit-breakers controlling the transformer, a line to Cassley and a feed to Durness. A fault-throwing switch is provided for 132 kV remote line disconnection. At Cassley, a 10 MVA, 33/11 kV Bonar Long transformer is provided. The 33 kV connection between Cassley and the substation is by wood pole line.

The 33 kV system in the area has Petersen coil protection. A lock-in protection system is used on the 132 kV line to Beauly, while a DZ impedance system is used on the line to Mybster and between Lairg and Cassley. For communications, a power line carrier on the 132 kV line is used to Lairg with telephone communications to the diversion weir and other stations.

The civil engineering consultants for the Shin scheme are Sir Murdoch MacDonald & Partners, the electrical and mechanical consultants are Messrs. Kennedy & Donkin, and the architects for the Shin and Lairg stations are Messrs. Shearer & Annand. The architects for Cassley are Messrs. Sinclair Macdonald & Son.

The main contractors for the Shin and Lairg section are:—Civil contractors, George Wimpey & Co., Ltd.; turbines, Boving & Co., Ltd.; alternators, Bruce Peebles & Co., Ltd.; switchgear, Ferguson Pailin, Ltd., A. Reyrolle & Co., Ltd., and Switchgear & Cowans, Ltd.; cabling for Shin, William Allan Smith & Co., Ltd.; cabling for Lairg, James Scott & Co. (Electrical Engineers), Ltd.; supervisory equipment, Automatic Telephone & Electric Co., Ltd.; water level indication, power line carrier, indication and communication circuits, Standard Telephones & Cables, Ltd.

The main contractors for the Cassley section were:—Civil contractors, R. J. McLeod (Contractors), Ltd.; generating plant, the Harland Engineering Co., Ltd.

Acknowledgment is due to the North of Scotland Hydro-Electric Board for permission to publish this article, to Mr. S. A. Craven, generation engineer of the Shin group, and his staff, and to the consulting engineers for invaluable assistance in the preparation of this article.

# Electrical Engineering Progress

IN his chairman's address to the Supply Section of the Institution of Electrical Engineers on 20th October, Mr. J. R. Mortlock suggested that electrical energy consumption was a good measure of the progress to a higher standard of living. In industrialised countries it was usual to assume a rate of growth which doubled consumption about every ten years. In highly industrialised countries the *per capita* electricity consumption showed no signs of saturation, and if to this growth was added the desired increase in consumption in the under-developed countries, the demand for electrical products should continue to increase materially. Our problem was at least to retain, but preferably to increase, our share of this market.

Mr. Mortlock went on to consider some of the advances in electrical engineering. Amongst many, two of the most striking were the application of nuclear fission to peaceful uses, and in the field of semiconductors. The former was the more spectacular, but it should be remembered that it was still an alternative source, albeit very attractive for some applications. To humanity in general a by-product, radioactive isotopes, was of more fundamental use. Modern semiconductors could handle some thousands of kilowatts with high efficiency and "lack of temperament." In 1948 the transistor principle had been discovered, and its subsequent development had enabled a semiconductor to behave essentially as the more conventional thermionic valve.

In the transmission field, only a few years ago 400 kV had been considered as the upper limit, but now 600 kV was acceptable and was being considered for projects in the U.S.S.R. and Canada. A better appreciation of the physical phenomena associated with the interruption of current had led to this advance.

Applications of electronics continued to increase rapidly. An American forecast was that in ten years' time there should be 50 per cent more goods and services available if the level of living was to continue to rise steadily. This would have to be obtained with an increase in the labour force of not more than 10 per cent. It followed that productivity would have to increase by about 3 per cent per year and, to attain this, automation would have to increase. Electronics, in some form, entered into the primary control of practically all automatic devices and, therefore, there should be a steady increase in its applications.

In some countries where electricity had to be competitive with other forms of energy, it was essential that the system should be run at all times at minimum cost. A group of power stations, with an aggregate capacity of about 1,500 MW, was now being controlled by a computer to this end. It was admitted that the scheme was complex and costly, but economically it had been fully justified.

Thus, an accelerating expansion in the boundaries of scientific knowledge was self-evident. Herein lay a risk in that, for the specialist in particular, there was a great temptation to concentrate in his chosen narrow field to the exclusion of interest in unrelated subjects, more specifically the "humanities." This aspect of engineering life was being appreciated increasingly by the universities. It was hoped that more stress would be placed on it by them, and still more so by the colleges of advanced technology, as they lacked that broadening which could be obtained in a university by the intermingling of the various faculties. Whether history, economics, etc., should be subjects in an engineering curriculum had yet to be agreed.

## Harwell Reactor School

THE 20th standard course at the Harwell Reactor School will commence on 4th January and continue until 29th April, and a special course for senior technical executives will be held from 9th to 20th May. The third Reactor School course on control and instrumentation of reactors will take place from 1st to 12th February and will be open to British and overseas students. It will be held at Durley Hall, Bournemouth. Further information and application forms can be obtained from the Principal, Reactor School, Atomic Energy Research Establishment, Harwell, Berks.

# Pilot-Wire Relay Characteristics

## Determination of Protective Scheme Performance by Polar Diagrams

By K. T. YEATES, Graduate I.E.E.*

**The operation of the single-phase system consisting of relays and pilot wires is considered on its own and then combined with summation transformers in a three-phase circuit to obtain a comprehensive polar diagram. Theoretical and practical methods of construction of the diagrams are described**

THE principle of comparing the current entering with that leaving a protected line section has been applied, generally successfully, in many different types of pilot-wire schemes. Pilot laying costs, intercore capacitance, and resistance are important factors affecting the possible application of a pilot-wire scheme to a new system.

Pilot-wire protection is more commonly applied to short lines, where pilot laying costs are not prohibitive. In this type of application pilot resistance and capacitance are small and do not seriously affect the scheme performance. In long line applications where pilots may already exist, be rented, or where in exceptional circumstances laying costs are considered permissible, the main application problems are those associated with pilot resistance and capacitance.

Most pilot-wire schemes have, for economy reasons, only two pilot wires and are, therefore, basically single-phase balanced systems, adapted for three-phase operation by means of summation transformers. These transformers are economy devices in that they attempt to make a single balanced system perform a duty which would be done more effectively by three separate balanced systems, a scheme which is economically impracticable.

Owing to the complex effects of summation transformers and through load, the prediction of fault setting, in cases where pilot resistance and capacitance effects are not negligible, is tedious and difficult. Polar diagrams which take all the above effects into account can be used to obtain a convenient and realistic presentation of scheme performance.

Referring to Fig. 1, the scheme can be considered as two separate systems, as shown by the dotted lines. Firstly, a single-phase balanced system is formed by the relays and the pilots. Secondly, the summation trans-

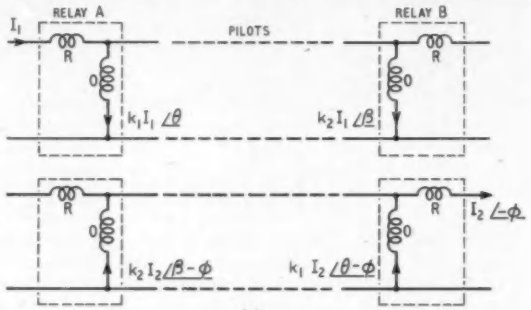



*Fig. 2.—Current distribution in the operating coils of two relays when interconnected by pilots. (a) $I_1$ and $I_2$ flowing independently. (b) $I_1$ and $I_2$ combined*

* English Electric Co., Ltd.

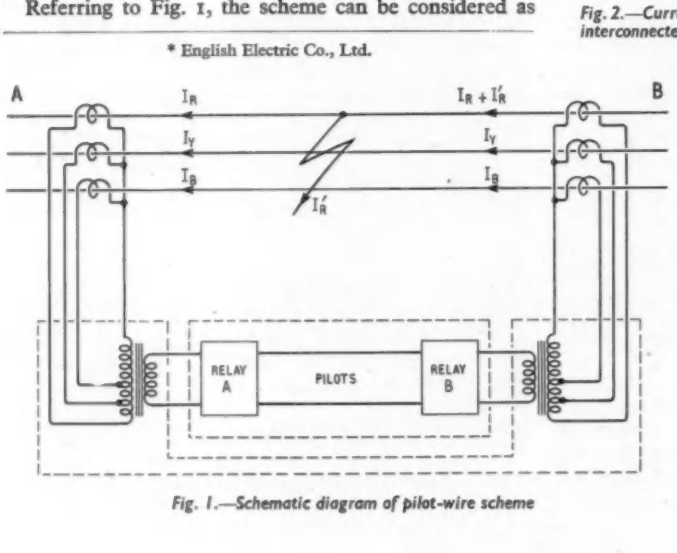
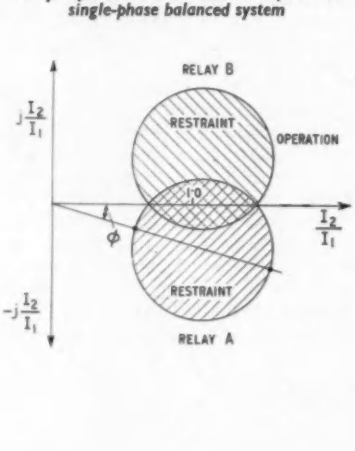



*Fig. 1.—Schematic diagram of pilot-wire scheme*

*Fig. 3 (below).—Polar diagram showing relay operation and restraint for the single-phase balanced system*



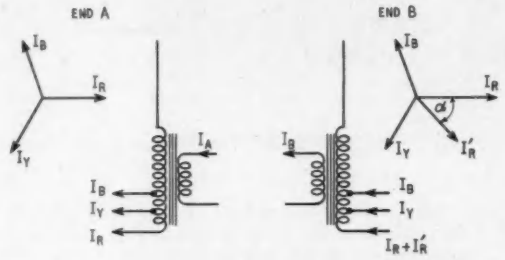



*Fig. 4.—Current in summation transformers with earth fault of $I'_R$ ampères at end B*

formers at each end give an output which is dependent upon (a) through load, (b) the magnitude and phase of the fault current relative to the through load, and (c) the phase or phases upon which the fault occurs. A convenient presentation of scheme performance under through load conditions can be obtained by combining the polar diagrams produced from an analysis of the above two systems.

## Single-Phase System

To illustrate the method of polar representation of single-phase system performance, a particular type of circulating current system, which lends itself to simple analysis has been chosen. Fig. 2 (a) shows the current distribution in the two relay operating coils when the currents $I_1$ and $I_2$ are considered as flowing independently. The constants $K_1$, $K_2$, $\Theta$ and $\beta$ depend upon pilot attenuation and phase shift. If now we consider the case when both $I_1$ and $I_2$ are flowing at the same time, the current distribution will be given by combining the above individual cases.

If the relays at ends A and B in Fig. 2 (b) are amplitude comparators, i.e. they compare the magnitude of the restraint relative to the operating current regardless of the phase difference, it can be shown that if the ratio $I_2/I_1$ to cause the operation of both the relays for a range of values of $\phi$, is plotted against the corresponding value of $\phi$, polar diagrams as shown in Fig. 3 will result. The circle diameters and centres on the polar diagram depend upon the constants $K_1$, $K_2$, $\Theta$, $\beta$ and the design of the amplitude comparator.

With circulating current schemes which are different from that illustrated it may be difficult and impracticable to obtain an expression for the circle diameters and co-ordinates of centres, but, nevertheless, the polar method can be applied experimentally, as will be shown later.

## Summation Transformers

The operation of summation transformers during through load conditions can be shown by considering a limited earth fault on the red phase of $I'_R$ amps (Fig. 4). The normal through load current is assumed to be unaffected by this current.

If the summation transformer ratio on the red phase $=k$, on the yellow phase $=k_1$ and on the blue phase $=k_2$, and if the angle between fault and load current $=\alpha$, the output of both transformers under normal through load conditions can be obtained as follows:—

$$I_A = \{kI_R - k_1 I_Y \cos 60 - k_2 I_B \cos 60\} + j\{k_2 I_B \sin 60 - k_1 I_Y \sin 60\}$$
$$= \left\{kI_R - \frac{k_1 I_Y}{2} - \frac{k_2 I_B}{2}\right\} + j\left\{\frac{k_2 I_B \sqrt{3}}{2} - \frac{k_1 I_Y \sqrt{3}}{2}\right\}$$

Since $I_R = I_Y = I_B$ under balanced through load conditions we can write:—

$$I_A = I_{TL}\left\{k - \frac{k_1}{2} - \frac{k_2}{2}\right\} + jI_{TL}\left\{\frac{k_2\sqrt{3}}{2} - \frac{k_1\sqrt{3}}{2}\right\}$$

$I_A = A + jB$ where, $I_{TL}$ = through load current,

$$A = I_{TL}\left\{k - \frac{k_1}{2} - \frac{k_2}{2}\right\} \text{ and}$$

$$B = I_{TL}\left\{\frac{k_2\sqrt{3}}{2} - \frac{k_1\sqrt{3}}{2}\right\}$$

If we now consider a fault on the red phase of $I_R$ which is fed from end B only, the output of the summation transformer at this end, i.e. $I_B$, can be derived as follows (Fig. 5):—

$$I_B = \{kI'_R \cos\alpha - k_1 I_Y \cos 60 - k_2 I_B \cos 60\} + j\{-kI'_R \sin\alpha + k_2 I_B \sin 60 - k_1 I_Y \sin 60\}$$
$$= \{kI'_R \cos\alpha + A\} + j\{B - kI_R \sin\alpha\}$$

It can be shown that if $\frac{I_B}{I_A}$ is plotted to the corresponding

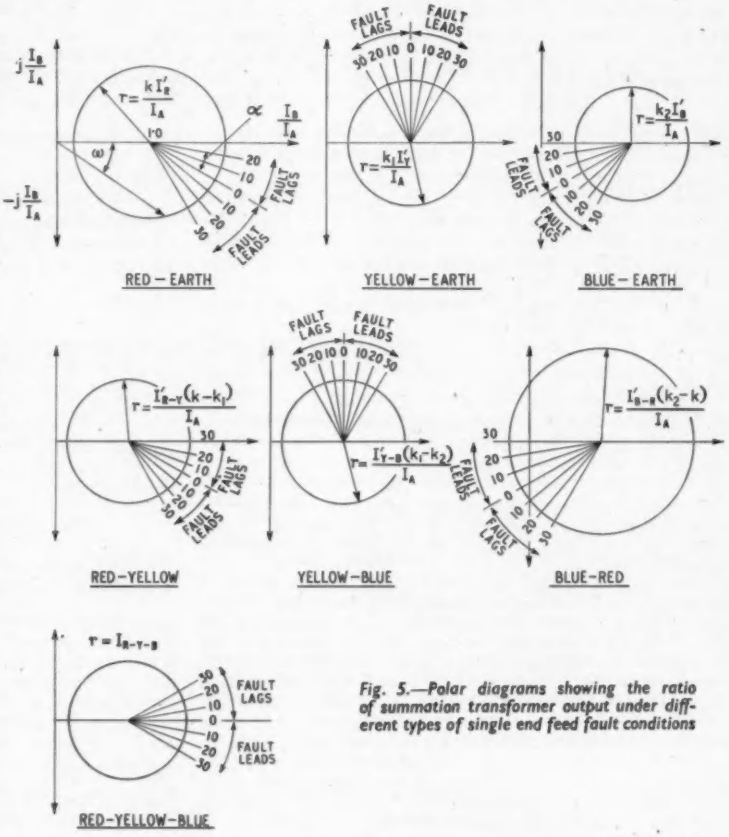



*Fig. 5.—Polar diagrams showing the ratio of summation transformer output under different types of single end feed fault conditions*

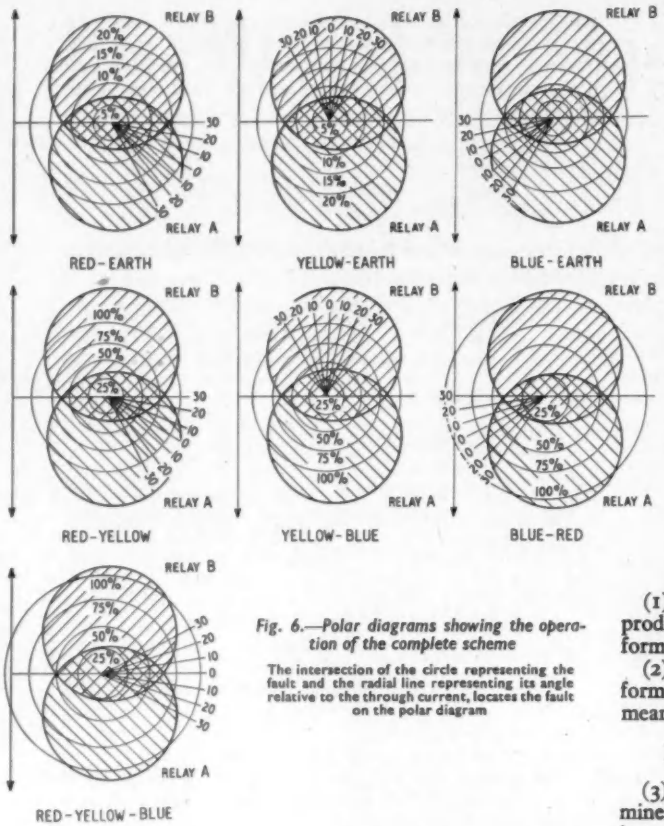



*Fig. 6.—Polar diagrams showing the operation of the complete scheme*

The intersection of the circle representing the fault and the radial line representing its angle relative to the through current, locates the fault on the polar diagram

phase angle ($\omega$) between $I_A$ and $I_B$, circles will result. By considering other types of fault, expressions similar to that obtained for the red phase will be produced.

The polar diagrams for each type of fault, in terms of transformer constants, are shown in Fig. 5. In the case of phase faults, $\alpha$ refers to the angle between the fault current and the leading-phase through current.

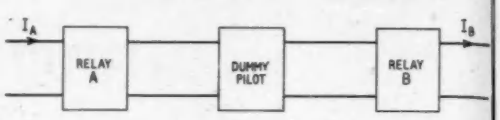



*Fig. 7.—Bench test apparatus for determining polar diagrams*

The performance of both relays can be predicted by combining the polar diagrams representing the performance of the single-phase relay system with those representing the ratio of summation transformer outputs for different types of fault fed from one end only. The polar diagrams are superimposed upon each other and relay operation depends upon the position of fault locations relative to the relay operating circles. Faults falling inside cause restraint, and operation if outside; see Fig. 6.

## Practical Tests

Should a pilot-wire scheme include summation transformers and the design be such that obtaining polar operating equations is difficult and cumbersome, simple bench tests can be used to produce operating diagrams (Fig. 7).

(1) Determine the summation transformer ratio, and produce the polar diagrams showing the ratio of transformer outputs for different types of fault.

(2) Determine the output of the summation transformers under balanced through load conditions, by means of the expression

$$I_A = I_{TL}\left[\left\{k - \frac{k_1}{2} - \frac{k_2}{2}\right\} + j\left\{\frac{k_2\sqrt{3}}{2} - \frac{k_1\sqrt{3}}{2}\right\}\right]$$

(3) Keeping $I_A$ constant at the value calculated, determine $I_B$ to cause relay operation for values of phase shift between 0 and 360 deg at, say, every 20 deg.

(4) Plot the ratio $\frac{I_B}{I_A}$ at the corresponding value of phase shift. The same form of polar diagram will result.

(5) By superimposing the polar diagram produced by measurements in (3) on the polar diagrams representing transformer operation for different types of fault (1) the performance of the scheme can be realistically presented.

# REPORT ON DESIGN

A CONTINUED extension of the activities of the Council of Industrial Design at home and abroad is recorded in its annual report for 1958-59. The most telling evidence of the Council's growing influence on visual standards is the increasing number of requests received from industry and commerce for help in finding and selecting qualified industrial designers. Last year there were 758 requests for designers, including 177 from the appliance and engineering industries.

By the end of March, 1959, the total attendance of visitors at the Design Centre since its opening three years earlier had reached almost two million. The average daily attendance remained at over 2,200, an increasing number being trade buyers from home and abroad. The number of firms represented rose from 739 to 792. A small version of the Design Centre displayed for three and a half weeks in a Newcastle store attracted 50,000 people, and three similar exhibitions were staged in three stores in Holland.

By the end of the year the Design Index contained records of 10,302 products made by 1,357 firms. Over 5,000 new items were considered by the Council's Design Index Selection Committee, of which 55 per cent were accepted.

The electrical industry is represented on the Council by Mr. D. W. Morphy, joint managing director of Morphy-Richards, Ltd., and on the Scottish Committee by Mr. T. Coughtrie, C.B.E., chairman and managing director, the Belmos Co., Ltd.

## New High Temperature Material

THE October issue of the six-monthly review of inventions for industry which is published by the National Research Development Corporation contains an interesting article describing a new high temperature material which has excellent thermal shock and oxidation resistance and adequate creep strength at 1,200°C. It has been produced by the Metallurgy Division of the Admiralty Materials Laboratory as a result of a search for stator blade materials for use in gas turbines. The best material was found to be silicon nitride stiffened with a fine dispersion of silicon carbide. The methods of producing components in the best physical form for this application are described in the article which also gives a short account of its properties and field trials in experimental gas turbines.

# VIEWS on the NEWS

*By REFLECTOR*

A SHARP attack is made in *Live Lines* (New Zealand) by Mr. W. H. Fortune, chairman of the Auckland Electric Power Board, upon the Auckland Gas Company for recent criticisms of the electricity supply industry. Hitherto the Board has refused to reply to "patently inaccurate and in many cases so ridiculous" statements by the company, but its latest efforts have stung the Board to take action. Several matters are dealt with. One was an allegation that the Board escaped taxation but Mr. Fortune shows that indirectly, through the N.Z. Electricity Department, it paid £118,000 in 1955-56. In 1956-57 the Gas Company paid £30,647 in income tax but received over £100,000 by way of Government subsidy. Another statement by the company was aimed at showing that electricity was much more expensive than gas, but Mr. Fortune quotes figures to prove that in the case of a "gas" house cooking and water heating cost £3 7s 9d a month while in an "electric" house the cost was only £1 8s 10d.

* * *

Dealing with the distribution of the revenue from the sale of electricity, an anonymous correspondent of the *Electrical Power Engineer* expresses the following rather peculiar sentiment:—

> "The consumer is still given priority, but does he deserve it. He gets everything out but puts nothing in. The producers have not benefited and what they have got has been obtained only after prolonged negotiations."

But surely the consumer is a *necessary* evil.

* * *

I always derive interest and often amusement from the reports of sectional meetings of the Electrical Power Engineers' Association, as reported in the Association's journal. In the October issue, for instance, I find the following little cameo:—

> "The possibility of holding a dinner or dance or even a social function of any kind met with the usual lack of enthusiasm. Several members who have interesting colour transparencies which they made on holiday, are getting together to show their pictures."

For my part I suffer from a lack of enthusiasm over other people's holiday snapshots while I don't mind parties.

* * *

"English Electric and Its People" publishes in its October number some notes on an old Willans & Robinson 3·5 i.h.p. central valve steam engine recently acquired by the Rugby Works Training School from Rugby Technical College. It was found that after many years of continuous running it was impossible to insert feeler gauges between the piston and the cylinder wall. The point which interested me most was the statement that, according to the records, the method of testing the accuracy of the cylinder bore was to place a plug gauge at the top of the cylinder and if it reached the bottom within four hours the cylinder was rejected.

* * *

Some unusual farm electrical applications are mentioned in the reports of district managers which form an interesting supplement to the South Eastern Electricity Board's annual report for the year ended 31st March last. One of the new consumers in the Croydon and Purley District, for instance, is a mink farm which has been established on land formed by tipping boiler ash from Croydon power station—the most remunerative example of this type of land recovery I have yet heard of. In the Thanet District, new floor warming installations include one at a mushroom farm at Woodnesborough. "Broiler" production is also responsible for a growing electrical load. In the Guildford District two chicken houses with a capacity of 16,000 birds have been equipped with sixteen off-peak 3 kW heat storage chick brooders, stated to be the first installation of its kind in Surrey.

* * *

A gradual change of name for those units at nuclear power stations which convert the heat energy in the gas flowing from the reactor into steam seems to have taken place. Originally designated in some quarters as steam-raising units, they later became generally known as heat exchangers, but I hear that it is now common practice, at least on some sites, to refer to them as boilers. Whilst all three descriptions are correct, for steam is raised, heat is exchanged and water boiled in them, I feel that the use of the shorter term "boiler" will eventually be adopted by most people.

* * *

As far back as 1909 (half-a-century ago) women were beginning to show a progressive interest in electrical development, apparently a greater interest than that manifested by some men. A report published in the *Electrical Review* for 5th November in that year bears witness to this:—

> "HAMMERSMITH.—At a recent Guardians' meeting the question of electricity supply to the Infirmary came up for discussion. One of the Guardians, a Mrs. Graves, thought it would be useful if a committee of women was appointed, as men had been considering the matter for 18 months with practically no result."

If the proposed committee had been formed it might have been the nucleus of an earlier E.A.W.

# New Magnetic Materials

AT the annual celebrity lecture and dinner of the Permanent Magnet Association held at Sheffield recently Dr. R. M. Bozorth, of the Bell Telephone Laboratories, U.S.A., spoke on the subject of new varieties of magnetic materials. He said that the different kinds of magnetism were determined by the different kinds of interactions between the atoms of which the materials were composed. Materials were thus paramagnetic, ferromagnetic, antiferromagnetic, or ferrimagnetic. Three different kinds of interactions giving rise to ferromagnetism and ferrimagnetism were specially considered. Examples showed the characteristic bulk properties of each. Borderline cases, and materials in which several kinds of interaction could occur at the same time, made classification sometimes difficult or even pointless.

The relatively new non-metallic materials such as the ferrites had found many applications and were better understood than most metals. After the spinels (Ferroxcube), we knew barium ferrite (Ferroxdur), and the garnets. The latter had the simplest structure, and substitutions of a great variety of different elements into the prototype, yttrium iron garnet, had given rise to many new compounds of this type. So far, these had given further valuable insight into the nature of interatomic forces, but no commercial applications had yet been made. It seemed hardly possible that in the future there would be none. New kinds of ferromagnetic ferrites were continually being discovered: gadolinium ferrite types had been investigated, and gallium ferrite had recently been discovered.

A distinctly new type of material was the ferromagnetic super-conductor which existed at very low temperatures. These materials had negative initial permeabilities, and hysteresis loops of an entirely new shape. It was supposed that they were composed of domains of ferromagnetism alternating with domains of super-conduction, the latter having a magnetisation antiparallel to the applied field.

## Old Faradians' Dinner

THE annual dinner of the Faraday House Engineering College Old Students' Association was held at the Savoy Hotel, London, on 29th October under the chairmanship of Mr. J. W. Bailey, the Association's president. Proposing a toast to Faraday House, Sir Willis Jackson, President of the Institution of Electrical Engineers, said he was pleased that the College, which had produced so many senior members of the electrical engineering profession, had retained its identity in the present expanding system of technological education. He thought that its motto—"Theory and Practice"—was most apt, for it stated the basic philosophy of the profession.

In dealing with the College's reputation for educating overseas students, Sir Willis said he thought that they exercised a beneficial influence on our own students while they in turn benefited from participating in our social activities. It was, however, difficult to make arrangements in industry for their practical training and they were therefore going to other countries, with adverse consequences for us as a nation. He appealed for an increase in the training facilities available, particularly in the case of groups of small firms.

The response was made by Mr. G. H. Randolph Martin, principal of the College, who, after paying tribute to members of the past and present governing boards, said that it was still the policy of Faraday House to meet educational requirements as they were presented. The high standard demanded by universities and professional institutions of those who were to qualify demanded high entry ability if the courses in further education were to be maintained at a reasonable length and in this connection he stated that the course available at Faraday House could be of three or four years' duration depending on the ability of the student at entry. The satisfying of entry requirements for colleges of further education was the responsibility of our schools, and a general improvement in educational standards from even the primary level might well have to be sought.

The toast to the guests was proposed by the chairman, and Sir Harold A. Wernher, chairman of Electrolux, Ltd., and Ericsson Telephones, Ltd., replied.

## CABMA Register

THE "CABMA Register 1959-60 of British Industrial Products for Canada," published jointly by Kelly's Directories, Ltd., and Iliffe & Sons, Ltd., for the Canadian Association of British Manufacturers and Agencies, is now available from Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1, price 15s post free.

Lord Rootes, chairman of the Dollar Exports Council, in his foreword says, "In 1958 the United Kingdom's exports to Canada fell by 4 per cent and Britain had a trade deficit with the Dominion of $323 million. Admittedly this was a year in which readjustment in her domestic economy forced Canada to cut her imports and, in fact, the British share of the Canadian market actually increased slightly—but the fact remains that a disparity of this size in trade between our two countries is unbalanced and unhealthy for all concerned. The men of industry and commerce themselves, both in Canada and in Britain, must grasp every opportunity to develop direct trade between the two countries. In this endeavour the CABMA Register will continue to play a vital role by making it simple for the Canadian purchaser to make contact with United Kingdom suppliers."

The Buyers' Guide lists alphabetically some 3,000 British products available to the Canadian market, with their suppliers given under each heading. The French equivalents of these headings are set out in alphabetical order in a separate glossary. A directory of nearly 4,000 British firms gives details of their distribution arrangements in Canada. Proprietary names and trade marks are given in special sections.

The CABMA Register is the Canadian buyers' standard work of reference and the degree of completeness and efficiency attained by this edition has once again been made possible by the full co-operation of the following sponsoring organisations: the Dollar-Sterling Trade Council in Canada and, in the United Kingdom, the Dollar Exports Council, the Federation of British Industries, the National Union of Manufacturers and the Scottish Council (Development and Industry).

## FEED WATER TREATMENT

IN a paper presented before the Institution of Mechanical Engineers on 21st October, Mr. P. Hamer (Imperial Chemical Industries) surveyed present-day methods of treating feed water, mainly for boilers raising steam at 1,000 to 2,000 lb/sq in (corresponding to about 550 to 640°F) and requiring a high percentage of make-up for power production and process purposes. Above 1,500 lb/sq in the general trend was towards the use of pure water, but every case called for careful study of the diverse individual conditions at the earliest stages of new boiler projects.

Control of steam purity to prevent corrosion and deposits through elimination of carbon dioxide, and the addition of volatile amines were discussed. The need to avoid corrosion in boilers during erection or when out of commission was emphasised. The chief chemical changes requisite being those concerning reduction of hardness, dissolved salts, bicarbonates and silica, the choice of treatment was practically limited to hot lime-base exchange or to blended acid and base exchange or to de-ionisation carried out in cold conditions. From the values worked out in the paper the amount of blow-down and the cost of chemicals, steam, power and staff, the operating costs of each method could be compared in any particular instance.

# Shop Lighting

## THE BRITISH LIGHTING COUNCIL'S CAMPAIGN

AT a Press conference last Friday Mr. W. J. Jones, director of the British Lighting Council, reported upon the progress of the shop lighting campaign upon which the Council embarked just over a year ago. He introduced a new publication prepared in connected with the campaign and was followed by Mr. John Boud, a member of the Council's staff, who exhibited coloured slides showing a variety of shop lighting fittings and methods. Mr. A. Willcock, assistant director, also addressed the meeting.

### Design of Lighting Schemes

The new 32-page publication, "Shop Lighting," is intended mainly for the use of electrical contractors and the staffs of Electricity Boards who have to design and install shop lighting schemes. It is priced at 1s 6d a copy or £5 10s a hundred. It begins by showing how much the lighting of commercial premises influences business and therefore how essential it is that the lighting arrangements shall be adequate and effective. There follows a brief dissertation on the general necessity for concealing the lighting fittings, although it is shown that there are exceptions.

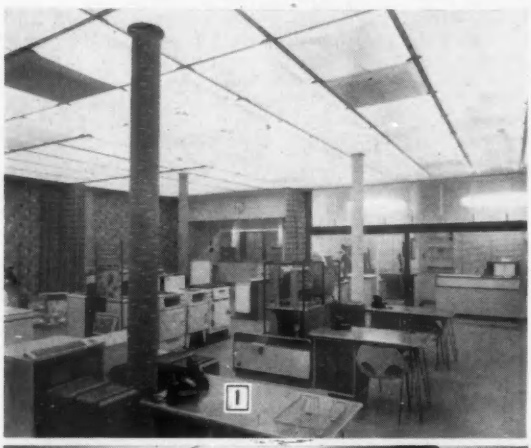
Shop window lighting is dealt with in the next few pages, the subject being treated from a number of aspects —types of installation, directional lighting, background lighting and general lighting. The subject of shop interiors is then covered. Reasons are given for various methods of treatment to attract customers and create "atmosphere." Special attention is paid to the lighting of special displays and to the improvement of existing installations. Life and vitality in lighting, the effect of directing the light appropriately and balance in display lighting are then touched upon. A few ideas in the way of treating the older shop, the back wall, the basement and the high ceiling are then introduced.

### Lamps and Fittings

The next section is devoted to lamps and fittings. Suggestions are made regarding the choice of lamps and guidance is given in the matter of colour matching. Particular mention is made of the use of louvres and diffusing panels and some of the more common fittings are described.

The value of after-hours lighting is stressed and a few examples of problems which are encountered are quoted in order to suggest solutions. The last few pages contain many examples of effective shop lighting in a variety of businesses. Throughout, the brochure is well illustrated, adding much to the interest which it undoubtedly possesses.

The address of the British Lighting Council is Bretten-ham House, Lancaster Place, London, W.C.2 (Telephone: Temple Bar 7337).



**EXAMPLES OF MODERN SHOP AND SHOWROOM LIGHTING**

*1. The London Electricity Board's Finchley Road showrooms. 2. Counter and shelves in the Electrical Department of Foulkes of Coventry. 3. Another example of illuminated ceiling in an "open" shop, with twin-tube fittings for the service counter*

# LETTERS TO THE EDITOR

*Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.*

## Teaching of Electrical Engineering

IN the *Electrical Review* of 9th October Professor H. L. Armstrong raises some interesting points relating to my methods of teaching elementary electrical theory ("Teaching of Electrical Engineering," *Electrical Review*, 10th April, 1959). Actually, I have already discussed the philosophical implications of my methods, at some length, in the more comprehensive paper which I offered to send to those interested (and which is available on loan from the Manchester College of Science and Technology). This paper discusses most of the points raised in the letter referred to above. However, I feel that some specific comments are called for.

I disagree that the question " Is science helped, in the long run, by emphasising superficial analogies and by taking fictions too seriously ? " is necessarily a valid one. It is certainly not a fundamental one, in relation to the teaching of elementary electrical theory. It is not necessarily valid because, as I have previously pointed out, a dogmatic statement that electric and magnetic fields are fictions simply cannot be justified in the light of present scientific knowledge. It would be equally valid to argue that electrons, protons, forces, etc., are mathematical fictions. We certainly do not understand the fundamental nature of any of these phenomena, as I am always at very great pains to point out to my students.

It is not true to say that " the region " is another name for " the ether." We can consider that free space itself is modified by the presence of matter. Free space is obviously a major constituent of the universe. Is it logical to assume that it has no physical properties whatsoever ? Einstein himself often stated the view that fields of force are simply modifications of free space. It is even suggested by some leading physicists that particles are simply disturbances in free space. Certainly there is nothing " solid " about material particles. The point is that, until our knowledge of the fundamental nature of the universe is vastly extended, any dogmatic statements on these issues are utterly unjustified.

Furthermore, the question posed by Professor Armstrong is not even important, much less fundamental, in relation to elementary electrical theory. As I have done my very best to emphasise, the important points are as follows:—

A thorough understanding of field theory is absolutely essential to the competent modern electrical engineer. The modern world requires very much greater numbers of competent electrical engineers than it has ever had before. The present methods of teaching electrical engineering fundamentals make it virtually impossible for any but the most intelligent students to obtain a thorough understanding of field theory. I believe that my methods make it possible for students of only *average* ability to obtain the required understanding. Even if the philosophical foundations of my methods do turn out to be suspect, this is not of great importance at an elementary level, since those students who are sufficiently brilliant to become theoretical physicists will not be unduly worried if they are required to adjust their ideas at a later stage. (I should emphasise again that in introducing field analogies I very clearly emphasise that these may be superficial.)

Certainly any attempt to teach field theory to *average* students by telling them at the outset that these fields are " mathematical fictions " is doomed to hopeless failure.

*Melbourne, Australia.* A. T. CRAVEN,
*Senior Lecturer in Electrical Engineering,*
Royal Melbourne Technical College.

## U.S.–Euratom Power Plan Difficulties

THE reluctance of European power undertakings to be rushed into building nuclear power stations has caused the virtual collapse of the joint programme agreed between Euratom and the United States last year. Under this agreement proposals for five nuclear power stations totalling 1,000 MW of installed capacity should have been lodged by 20th October. Only two firm proposals were received. Details of one of these, the station to be built by the International General Electric Company in Italy for Elettronucleare-Senn, have already been announced and construction would have proceeded irrespective of the United States-Euratom agreement. This station will employ a boiling water reactor. The second proposal is for an organically moderated reactor to be built in Germany by North American Aviation with its German branch, Interatom, and Brown Boveri, Mannheim.

## Electricity on the Farm

THE fourth George Johnstone Lecture, sponsored by the South Western Electricity Board in association with the Seale Hayne Agricultural College, Newton Abbot, was delivered on Friday last by Lord Netherthorpe, president of the National Farmers' Union, who spoke on " Agriculture and its Relation to the National Economy and Industry." Lord Netherthorpe said it was absolutely essential that all farms should have electricity and he commended the Area Boards on the progress made in rural electrification. He agreed that the average electricity consumption on farms, which had doubled in ten years, was still not high, but said that, given a reasonably satisfactory level of farm income, he was convinced that a considerable potential existed for the increased use of electricity.

*Left to right: Mr. A. N. Irens, chairman, South Western Electricity Board ; Sir George Hayter-Hames, chairman, Devon County Council; Lord Netherthorpe; and Professor Moore, principal of the Seale Hayne Agricultural College*

# PERSONAL AND SOCIAL

## *News of Men and Women of the Industry*

**Mr. T. W. Heather,** assistant managing director of the General Electric Co., Ltd., who has been a well-known and respected figure in the electrical industry for many years, retired on 31st October. He had one of the longest records of service in the G.E.C. and had been a member of the board for over 21 years. Mr. Heather started with the company on 1st January, 1914, but on the outbreak of war joined the Middlesex Regiment. He served as adjutant of the 1st Battalion (the "Die-Hards") in France and Flanders, and subsequently on brigade and divisional staffs. He was awarded the M.C. and bar, and was mentioned in despatches.

*Mr. T. W. Heather*

On his return to the G.E.C. in 1919, he became assistant manager of the company's publicity organisation, and six years later was appointed personal assistant to Mr. Max Railing, then vice-chairman and joint managing director. He was appointed sales manager in 1933 and was responsible for the subsequent growth of the G.E.C. sales organisation. In 1939 he supervised the company's decentralisation plans against the threat of the second world war. He was appointed assistant managing director in charge of the general products group in 1957.

Mr. Heather has been chairman or director of a number of companies, including the M.O. Valve Co., Ltd., Salford Electrical Instruments, Ltd., Pirelli-General Cable Works, Ltd., and Computer Developments, Ltd. In addition, he served on many B.S.I. and other committees in the industry, but is probably best known for his work in the Electrical Fair Trading Council since its inception. He became its vice-chairman in 1945 and chairman in 1956. He is also a past-president of the Electrical Trades' Commercial Travellers' Association. He has been greatly interested in education in industry and has been chairman of the G.E.C. Education and Training Committee. Among his many outside interests, he is a keen traveller, photographer and model engineer, and is a Past-Master of the Worshipful Company of Makers of Playing Cards.

**Mr. T. B. O. Kerr,** a director and secretary of the General Electric Co., Ltd., has now been appointed director for finance and administration. **Mr. O. W. Humphreys,** research director, becomes director for research and technical development and **Mr. W. J. Bird,** home sales director, is appointed director for sales and marketing development.

**Mr. A. E. W. Austen,** B.Sc., Ph.D., A.M.I.E.E., F.Inst.P., who, as we briefly reported in our last issue, has been appointed chief engineer of C.A.V., Ltd., has been chief research engineer of the company since 1946. He graduated in physics at the Royal College of Science, University of London, in 1933, and obtained the degree of Ph.D. in 1936. In 1935 he joined the staff of the British Electrical and Allied Industries Research Association, where he worked mainly on electrical engineering subjects. Dr. Austen joined C.A.V., Ltd., in 1946 in order to develop the Research Department. He has made a special study of the techniques of fuel injection systems and latterly he has been concerned also with administrative matters, including the application of large digital computers to both technical and commercial problems.

**Mr. W. E. W. Nicolls,** B.Sc., who has been appointed by C.A.V., Ltd., as chief engineer for overseas operations, has been chief development engineer since 1948. He took his degree in mechanical engineering at King's College, London, and served a post-graduate apprenticeship with Petters, Ltd. He then spent some time on the development of diesel engines, followed by a period on the design of small petrol engines. He joined C.A.V. as diesel development engineer in 1936.

*Dr. A. E. W. Austen*

*Mr. W. E. W. Nicolls*

**Mr. F. H. Beasant,** B.Sc., M.I.Mech.E., M.I.E.E., M.I.Loco.E., has returned to England from Australia to take up an appointment as deputy manager of the Traction Division of the Brush Electrical Engineering Co., a member of the Hawker Siddeley group. He will be based at 32, Duke Street, St. James's, S.W.1.

The Eastern Region of British Railways announces the appointment of **Mr. G. C. Gold,** A.M.I.Mech.E., M.Loco.E., formerly assistant mechanical and electrical engineer, Eastern and North Eastern Regions, Doncaster, as mechanical and electrical engineer (workshops), in the Department of the Chief Mechanical and Electrical Engineer, Eastern Region. Mr. Gold will remain at Doncaster.

**Mr. Austen Albu,** M.P., has taken over our Parliamentary commentary from Mr. A. M. F. Palmer and his first contribution appears on page 609 of this issue. Mr. Albu was educated at Tonbridge School and the Imperial College of Science and Technology (City and Guilds College), graduating B.Sc. (Engineering). From 1926 to 1930 Mr. Albu was with Electrolux, Ltd., and he was then for about sixteen years with Aladdin Industries, Ltd., with whom he was works manager. In 1946-47 he acted as deputy president of the Governmental Sub-Committee, Control Commission for Germany, and in 1948 became deputy director of the British Institute of Management. He has been M.P. for Edmonton (Labour) since November, 1948.

*Mr. Austen Albu*

Mr. Albu is vice-president of the Parliamentary Scientific Committee, a member of the boards of governors of Imperial College and Battersea College of Technology, a member of the Paddington Group Hospital Management Committee and of the executive committee of the Fabian Society. He is also an Associate Member of the Institution of Mechanical Engineers and a Member of the Institute of Production.

**Mr. G. W. Child,** a director of the London Electric Wire Co. & Smiths, Ltd., having reached retirement age, is resigning from the board on 31st December next. He has been in the service of the company since 1936 and has for many years been general manager of the Salford and Trafford Park Works.

Speaking at the annual Motor Show dinner of **Oldham & Son, Ltd.,** held at the Connaught Rooms, London, on 29th October, Mr. John Oldham, O.B.E., chairman of the company, said that the time was coming when a motor car would become as much a part of everyday life as the washing machine or television. Mr. Oldham mentioned the introduction by the company of a new "economy" battery to meet the requirements of the owners of small cars, and also a new traction battery. He expressed his

confidence in the future of the coal-mining industry in which the company was largely interested.

On the personal side, Mr. Oldham referred to the pending retirement of Mr. S. J. Wrigglesworth, O.B.E., and the appointment of Mr. Orlando Oldham (of the fourth generation of the family in the management) as assistant managing director.

The toast of the guests proposed by Mr. Oldham was ackowledged by Mr. E. N. Hiskins, who proposed "Our Hosts" and Mr. Edward C. Oldham (joint managing director) replied. Mr. Wrigglesworth, who presided at the dinner, made a few remarks and afterwards there was an excellent cabaret.

*At the annual dinner of the Midlands Branch of the E.T.C.T.A. : Mr. S. W. Graefe (branch vice-chairman), Mr. D. Salberg (principal guest), Mr. P. M. King (branch chairman) and Mr. S. E. R. Barker (national chairman)*

**Mr. K. T. Yeates,** Graduate I.E.E., who writes in this issue on "Pilot Wire Relay Characteristics" (page 594), received his technical education at Stafford Technical College and after completing his apprenticeship at the Stafford Works of the English Electric Co., Ltd., he entered the light current field in the company's meter laboratory. He is now section leader of a team engaged upon the design and development of protective relays. Mr. Yeates has lectured in electrical engineering at the Stafford Technical College.

*Mr. K. T. Yeates*

Executive changes are to be made in the traction organisation of the English Electric Co., Ltd., following the retirement of **Mr. C. M. Cock,** M.I.Mech.E., M.I.E.E., A.M.I.E. (Aust.), M.I.Loco.E., as general manager of the Traction Department at the end of this year. **Mr. H. J. H. Nethersole,** M.I.E.E., M.Amer.I.E.E., A.M.I.Mech.E., who has been managing director of the English Electric Co. of South Africa (Pty.), Ltd., since 1947, is relinquishing this post to become general manager of the Traction Department, but will continue as a member of the board of the South African company when he takes up his new duties. He will be succeeded as managing director in South Africa by **Mr. R. B. Price,** who is already a director of the South African company and general manager of the Benoni Works. **Mr. L. L. Brinkworth,** chief engineer of the South African company, will become technical director of that company on 1st January next.

*Mr. C. M. Cock*

*Mr. H. J. H. Nethersole*

*Mr. R. B. Price*

**Mr. J. Duffield** has been appointed general manager of the overseas companies in South Africa of Thorn Electrical Industries, Ltd. For the last five years Mr. Duffield has been area manager for Atlas Lighting, Ltd., in Birmingham. He joined Thorn Electrical in 1946 as a representative in the West Country and in 1952 became Atlas area manager in Cardiff. He took up his new appointment on 2nd November.

**Sir Leslie Gamage,** president of the Electrical Industries Benevolent Association, and the Hon. Lady Gamage attended the ball of the South Wales and Monmouthshire Branch of the Association held in Cardiff on 30th October. Sir Leslie congratulated the Branch on its achievements and promised an additional £100 to its funds.

**Mr. E. W. Golding,** overseas liaison officer of the Electrical Research Association, will be away from England until the end of January. He is making an extensive tour of Africa, where he will discuss electrical research problems with E.R.A. members and potential members in various territories.

The annual dinner of the Midlands Branch of the **Electrical Trades' Commercial Travellers' Association** was held at the Pavilion suite at the county ground, Edgbaston, Birmingham, on 23rd October. Mr. S. E. R. Barker, national chairman, proposed the toast of the branch and congratulated it upon its progress and its efforts for charity during the year. Mr. P. M. King, branch chairman, responded and gave a brief outline of the activities of the branch. Mr. S. W. Graefe, vice-chairman of the branch, proposed the toast to the guests and Mr. Derek Salberg, the well-known theatrical figure and a member of the Warwickshire County Cricket Club management committee, responded. The charity appeal was made by Mr. A. E. Bishop.

**Mr. J. D. Riddle,** B.Sc.(Eng.), D.I.C., A.M.I.Mech.E., A.M.I.E.E., has been appointed manager of the turbine factory, Rugby, of the British Thomson-Houston Co., Ltd. After receiving his early technical education at Rutherford Technical College, Newcastle, he studied at Bournemouth Municipal College and Imperial College, London. He served his apprenticeship at C. A. Parsons & Co., Ltd., Newcastle-upon-Tyne, and after a short period with Aish & Co., Ltd., Bournemouth, joined the B.T.H. Co. in 1949 as a design engineer in the Rectifier Engineering Department. Two years later he transferred to Turbine Methods Development. In 1956 Mr. Riddle became assistant superintendent of the turbine factory and was appointed superintendent in 1958. He succeeds **Mr. J. S. Borrington,** who has been appointed to the staff of the director of manufacture, responsible for the organisation of manufacturing staff training.

*Mr. J. D. Riddle*

The **Electrical Contractors' Association** (Southern Section) recently held its annual dinner at the Polygon Hotel, Southampton. Proposing the toast of the E.C.A. and Allied Associations, Mr. J. D. Johnson, commercial director, Simplex Electric Co., Ltd., said he saw better times ahead. He traced the progress of the E.C.A. through the immediate post-war period of shortage and the credit squeeze, and said he felt that we were about to embark on a better era. There was a great bulge of work going forward and 1960 would

be a boom year. Referring to unprofitable, intense and undue competition which had been a feature of the industry in the past ten years, he said that if the industry fell into a price war the quality of goods must suffer.

Responding, Mr. V. J. Stock (president) pointed out that more engineers in this country received their training from the hands of E.C.A. members than from any other source in the electrical industry. The Association also covered the large and small retailers.

The toast to the guests was proposed by Mr. A. H. Wright, chairman of the Southern Section, and Councillor A. G. Asquith-Leeson, J.P. (Portsmouth), responded.

The annual dinner-dance of the **Electrical Contractors' Association of Scotland** was held in the Grosvenor, Glasgow, on 28th October, with Mr. J. Y. Dick, president, in the chair. The toast to the Association was proposed by Mr. A. S. Black (director, General Electric Co., Ltd.) and replied to by Mr. Dick. Mr. Alex. Robertson (vice-president) proposed the toast to the guests and Mr. J. Gogan (chairman, Scottish Committee, N.I.C.E.I.C.) responded.

**Mr. E. C. Holroyde** has resigned as a vice-chairman and director of Crompton Parkinson, Ltd., at his own request to allow for the appointment of younger men. **Mr. Michael Parkinson** has been elected a vice-chairman and **Mr. J. B. Scott** a director of the company.

Presentations of long-service gifts and awards commenced at **W. H. Allen, Sons & Co., Ltd.,** Queens Engineering Works, Bedford, on 28th October and continued on 29th and 30th October, and again on 2nd, 3rd and 4th November, culminating on 4th November when forty-five employees and senior members of the company met at a special dinner to celebrate their having been in its service for forty years or more in the case of women, and forty-five years or more in the case of men. In all the number of gifts presented totalled 415. In a short speech at the beginning of the ceremonies the chairman of the company, Mr. W. K. G. Allen, stated that the scheme was not a new one as far as the company was concerned, but that it was an improved scheme to recognise the completion of 25, 35 and 45 years' service by men, and 25, 35 and 40 years by women.

The annual dinner of the **I.E.E. North Midland Centre** will be held on 20th November at the Queen's Hotel, Leeds. Applications for tickets (members 32s 6d each, students 15s each) should be made by 13th November to Mr. J. N. Griffiths, assistant hon. secretary, c/o Associated Electrical Industries, Ltd., St. Paul's House, 20-22, St. Paul's Street, Leeds, 1.

**Professor E. B. Moullin** is to retire from the Chair of Electrical Engineering at Cambridge University on 1st October next year.

**Mr. C. W. V. Davis,** a director of Research & Control Instruments, Ltd., will head the newly-formed Industrial Products Division of that company which will in future distribute Philips arc welding supplies, filtration equipment and high frequency generators.

A large gathering of engineers in the lighting and associated industries, accompanied by their ladies, enjoyed a buffet supper and dancing at a reception given by the president, Mr. H. G. Campbell, and the Council of the **Illuminating Engineering Society** at the County Hall, Westminster, London, on Friday last. In an entrance foyer guests saw a display of paintings, prints and exhibits depicting the London scene, with emphasis placed on the illumination aspect, in 1909. Original examples of early lamps of both the oil and gas type were shown with some of their then new electrical competitors, while the subjects covered by the illustrations included education, transport and some of London's early generation and distribution schemes.

**Mr. T. A. F. Gooch** has been appointed assistant sales manager of the A.E.I. Lamp & Lighting Co., Ltd. Mr. Gooch, who has been the Preston area manager since 1955, will now have his office at the company's headquarters building at Leicester. He received most of his early technical training as a boy entrant in the Royal Ordnance Corps and completed his technical studies at Salford Royal Technical College and then at London University, where he took an external degree in electrical and mechanical subjects. He joined the Metropolitan-Vickers Electrical Co., Ltd., in 1940 and was appointed assistant lighting engineer at the Birmingham office. He held this post for three years until he was transferred to the Manchester office as senior lighting engineer.

*Mr. T. A. F. Gooch*

**Mr. E. F. Lyne** has been appointed Manchester area sales superintendent, and **Mr. S. Smith** Cheltenham area sales superintendent. Mr. Lyne was formerly the Manchester regional

*At the reception given by the president and Council of the Illuminating Engineering Society. Right: Mr. and Mrs. L. C. Penwill being received by the president (Mr. H. G. Campbell). Below: Sir Willis Jackson (president, I.E.E.), Lady Jackson, Mr. B. Spence (president, R.I.B.A.), Mrs. Spence, Mrs. O. W. Humphreys, Mr. D. L. Tabraham and Mrs. Tabraham*

*The Hon. Lady Gamage presenting the trophy to D/S E. A. Farmer, who led the G.E.C. Witton "A" Division, winners of the Gamage Ambulance Cup*

lighting engineer, a post he had held since 1957. Mr. Smith joined the Nottingham office of the B.T.H. Co. as a lamp and lighting salesman in 1949, after 15 years as a factory electrical engineer.

**Mr. T. T. Davies,** Associate I.E.E., M.Inst.F., F.A.M.E., M.E., retired from the service of the London Electricity Board on 30th September last. He joined the electricity supply industry in 1931 as a power station superintendent in Plymouth, and on his retirement was district engineer in the East End District, a position he had occupied since the Board's reorganisation in 1957. Before nationalisation he was chief technical assistant with the Stepney electricity undertaking and in 1948 was appointed operation and maintenance engineer in the Board's Northern Sub-Area. A large gathering of Mr. Davies' past and present colleagues attended when he was recently presented with a radio set and premium bonds by the Board's chief engineer, Mr. L. H. Welch.

*Mr. T. T. Davies*

**Miss Elsie K. Pearce,** previously personal assistant to Sir Henry Self (until recently chairman of the Electricity Council), has now joined the staff of the British Electrical and Allied Manufacturers' Association as personal assistant to the director, Mr. S. F. Steward.

At the **General Electric Co., Ltd.,** annual competitions of the St. John Ambulance Brigade, teams from the Witton Engineering Works swept the board, and all the individual awards were won by Witton personnel. The event was held at the Magnet Club of the company's Witton Works and teams from Coventry Telephone Works, Chamberlain & Hookham, and Witton Works competed. At the tea which followed, Mr. J. J. Gracie, director and general manager of the Witton Works, welcomed the Hon. Lady Gamage, Dame of Justice, Order of St. John county superintendent (N) Berkshire, who then presented the trophies.

**Mr. H. B. Dreyfus,** B.Sc.Tech., M.I.E.E., formerly a principal assistant engineer in the Engineering Department of the Central Electricity Generating Board at headquarters, has been appointed system design and development engineer of the Board.

Mr. Dreyfus started his technical career with Marconi's Wireless Telegraph Co., Ltd., in 1930 as a college apprentice. In 1932 he joined Supra Electra Motors as personal assistant to the technical director, and in 1933 entered the employ of the then Central Electricity Board (North West England and North Wales Area) as assistant technical engineer. In 1946 he was appointed system development engineer for the South West England and South Wales Area at the C.E.B. head office in London. On the formation of the British Electricity Authority in 1948 he continued on system design work until 1955 when he became responsible for the design of the 275 kV grid system for the whole country. In 1958 he was promoted to principal assistant engineer.

**Mr. P. Taylor,** A.A.C.C.A., sub-area accountant in the No. 3 (Sheffield) Sub-Area of the Yorkshire Electricity Board, retired on 31st October after completing forty-six years' service in the electricity supply industry.

**Mr. R. Longley,** A.I.M.T.A., has been appointed sub-area accountant to succeed Mr. Taylor. Mr. Longley was formerly employed as principal assistant in the Chief Accountant's Department of the Yorkshire Electricity Board. From 1930 to 1948 he was a member of the City Treasurer's Department, Leeds.

## OBITUARY

**Mr. J. Dunford Smith,** F.I.A.M.A., former advertising manager of W. T. Henley's Telegraph Works Co., Ltd., died on 30th October at the age of fifty-nine. Mr. Dunford Smith joined Henley's in their Research Laboratories in 1920. He transferred to the advertising side of the company in 1929 and became advertising manager in 1946. He edited the company's house journal, *Distribution of Electricity*, and he was also advertising manager of Henley's Tyre & Rubber Co., Ltd., and other Henley subsidiaries. Mr. Dunford Smith retired in 1955 on account of ill-health.

**Mr. John Sullivan,** C.B.E., who joined the South West Scotland Electricity Board as a part-time member in 1948 and was reappointed on the formation of the South of Scotland Electricity Board, becoming chairman of the Electricity Consultative Council, died on 1st November at the age of fifty-nine.

**Mr. F. Newton.**—The death has occurred at his home at Yoxall of Mr. Frederick Newton, a director and one of the founders of Newton Brothers (Derby), Ltd. He was seventy-four. For a long period Mr. Newton was technical consultant to Newton Brothers as well as being a director.

**Mr. H. R. Turner.**—The death occurred recently at Lausanne, Switzerland, of Mr. Harold Rupert Turner, former chairman and managing director of Ferodo, Ltd., and director of Turner & Newall, Ltd.

**Mr. Lionel Smith,** commercial director of the Benjamin Electric, Ltd., died on 28th October at the age of fifty-six. Mr. Smith entered the service of the company in 1925 as sales engineer, later becoming manager of the Sales Department, then personal assistant to the late Mr. Guy Campbell, and he was elected to the board in 1938 as commercial director. He was a member of the E.L.F.A. Council.

*The late Mr. L. Smith*

**Mr. C. W. Pearce,** a director since 1945 of Dynamo & Motor Repairs, Ltd., died on 23rd October.

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**Mr. T. E. Goldup.**—A memorial service to the late Mr. T. E. Goldup, a past-president of the Institution of Electrical Engineers, was held on 28th October at the Queen's Chapel of the Savoy. The Rev. C. Cresswell officiated and gave an address, assisted by the Rev. H. E. Wallace and Prebendary E. H. Williams-Ashman. In addition to members of the family, a large number of electrical men from all branches of the industry attended, including Sir Willis Jackson, President of the I.E.E., Sir Gordon Radley (past-president), Mr. S. E. Goodall (immediate past-president) and Mr. W. K. Brasher (secretary of the I.E.E.).

# INDUSTRIAL NEWS

## New Valve Manufacturers' Association

The British Radio Valve Manufacturers' Association announces that in the near future it will hand over to a new Association, the Electronic Valve and Semi-Conductor Manufacturers' Association, its responsibilities for semi-conductors and industrial valves and tubes. The B.V.A. will continue its separate interest in domestic valves and television tubes.

Founder members of the new Association, to be known as VASCA, are: The English Electric Valve Co., Ltd.; M.O. Valve Co., Ltd./General Electric Co., Ltd.; Mullard, Ltd.; Siemens Edison Swan, Ltd./British Thomson-Houston Co., Ltd.; and Standard Telephones & Cables, Ltd. The chairman is Mr. G. A. Marriott. Sections, virtually autonomous, will deal separately with transmitting, including micro-wave, valves; semi-conductors, including rectifiers up to a rating to be defined by the Section; industrial receiving valves; gas-filled devices; and industrial cathode ray tubes, photo-electric and photo-sensitive devices. Invitations have been issued to manufacturers of valves, tubes and semi-conductors falling within these sections.

Among the objects of VASCA are the provision of facilities for discussion and co-operation among members; promotion of standardisation; encouragement of and participation in research and experimental engineering work and tests; co-operation with the Government, the Services, B.S.I., the I.E.C. and the I.E.E.; maintenance of a high standard of quality, design and workmanship; provision of information to members; compilation and dissemination of statistics; and the promotion of exports. The secretary of VASCA is Mr. W. R. West, and the offices are at Piccadilly House, 16, Jermyn Street, London, S.W.1.

## Cable Manufacture in India

A joint enterprise sponsored by the Investment Corporation of India, Ltd. (one of the Tata group of companies), and W. T. Henley's Telegraph Works Co., Ltd., known as Henley Cables India, Ltd., has been incorporated in India. Henley's hold over half of the shares and the Investment Corporation of India the bulk of the remainder. Mr. A. D. Shroff, a director of Tata Industries and of a number of other associated companies of Tata, is chairman of the new company. The other directors are Sir Alexander Sim (chairman of Henley's), Mr. K. C. Bakhle (a director of Tata Industries and a number of allied companies), Mr. N. K. Petigara (senior partner of Mulla & Mulla & Craigie Blunt & Caroe, a leading firm of solicitors in Bombay, and also a director of several well-known concerns in India) and Mr. P. H. Scrine (Henley's manager in India), who will be managing director.

A 40-acre site has been acquired at Hadapsar, near Poona, for the erection of a factory for the manufacture, in the first place, of rubber and plastic insulated house-wiring cables and for the drawing of copper wire. The marketing of Henley cables throughout India will be undertaken by Messrs. Voltas, who are well known for their engineering activities and as distributors of electrical and industrial equipment.

## Coal Output to be Reduced

At a meeting with the National Executive Committee of the National Union of Mineworkers last week the National Coal Board outlined the measures which it considered must be taken to meet the present situation in the industry. These included a cut of four million tons in open-cast production in 1960 and the closure of six pits on economic grounds in addition to the 24 pits which would close because their reserves would be exhausted and the 16 pits which would merge with others or whose man-power would be transferred to neighbouring pits. Some reduction of output from other pits by single-shift working and other means would also be undertaken. The Board stated that it would do all it could to minimise the discharge of men.

## Electricity Supply Workers' Claims

Representatives of the five unions with members in the electricity supply industry had a "friendly but frank" discussion with Mr. C. R. King, chairman of the Electricity Council, and Sir Christopher Hinton, chairman of the Central Electricity Generating Board, on 29th October upon the conciliation machinery. It was agreed that the outstanding claims for the 40-hour working week and three weeks' holiday with pay would continue to be dealt with by the negotiating machinery.

## British Overseas Trade Fairs

Arrangements have recently been concluded to broaden the base of British Overseas Fairs, Ltd. The presidents of the Association of British Chambers of Commerce and of the National Union of Manufacturers, Mr. Frank Bower, C.B.E., and Mr. M. D. Oliphant, M.B.E., T.D., respectively, have been elected to the board and the directors are now Sir Norman Kipping (chairman), Mr. Frank Bower, Mr. W. P. N. Edwards (managing director), Sir Leslie Gamage, Lt.-Col. Lord Dudley Gordon, Mr. M. D. Oliphant and Mr. P. F. D. Tennant. The Grand Council of the Federation of British Industries will as before determine the programmes of British trade fairs overseas, but it will in future be advised by a new Export Promotion Policy Committee of which Sir Leslie Gamage is the chairman.

British Overseas Fairs, Ltd., will remain a private company but in order to provide working capital and to avoid the need for raising guarantee funds for individual projects, 100,000 ordinary shares of £1 each, 10s paid, are being issued to certain members of the F.B.I., to the F.B.I. itself and to the National Union of Manufacturers. The company's main task at present is the organisation of the British Exhibition and Trade Fair to be held in New York from 10th to 26th June next year. To assist in this task, an Executive Committee has been set up consisting of Lord Rootes (chairman, Dollar Exports Council), Mr. W. H. McFadzean (president, F.B.I.), Sir Hugh Stephenson (H.M. Consul-General, New York), Mr. Peter Garran (Commercial Minister, British Embassy, Washington), Sir Norman Kipping (director-general, F.B.I.), Sir Francis Evans (B.O.F. liaison officer for supporting programmes), Sir Alexander Brackenridge (chairman, Exhibition Liaison Committee in New York) and Mr. W. P. N. Edwards.

## John Thompson in Ireland

To mark the appointment of the Accurate Instrument Co., of Dublin, as the Irish agents of the John Thompson Instrument Co., of Wolverhampton, a cocktail party and film show was given by the John Thompson Group directors, at the Shelbourne Hotel, Dublin, on 3rd November. A number of directors and senior staff attended. One of the films showed the work being carried out by the A.E.I.-John Thompson Nuclear Energy Co. on erection of the steam raising plant for Berkeley nuclear power station, while panels displayed the group's products.

## The Hunterston Stoppage

The Motherwell Bridge & Engineering Co., Ltd., which on 25th September stopped operations on its £8 million contract at the nuclear power station at Hunterston, has offered to meet the unions with a view to resuming operations, provided that national as well as local trade union officials attend the meeting.

The company suspended operations on its contract for reactor and steam raising units at the station because of the "serious dislocation of production due to the present and recent outbreaks of unofficial strikes" and terminated the contracts of about 500 men belonging to six different unions. Three separate unofficial strikes were at that time in progress and the company was already nine months behind schedule because of the strikes. Union

officials have now been informed that the company is willing to meet them under the auspices of the Ministry of Labour Industrial Relations Department. Two union officials said last week that they did not think the national officials would be disposed to attend the proposed meeting.

About 1,500 men employed by other contractors are still at work at Hunterston.

## Order for New Cable Repair Ship

An order valued at nearly £250,000 for the 3,270 s.h.p. diesel-electric propulsion machinery and associated equipment in the new 4,000-ton Cable & Wireless cable repair ship has been received by the English Electric Co., Ltd., from the shipbuilders, Cammell Laird. Besides the main and auxiliary diesel-generating equipment the contract includes propulsion motors, switchgear, control gear and motors driving the auxiliary machinery. The engineering is being carried out by the company's Marine Projects Division. The four RLM main diesel engines, with a total output of 4,640 b.h.p., will be made at the company's Rugby works, the auxiliary engines at the Vulcan Foundry and the heavy electrical machinery and control gear at Stafford.

## Lamp Sales Campaign

Ascot "Double-Life" lamps, available for the past twelve months for commercial use only, are to be introduced on a regional basis to the consumer market. This was announced by Mr. Z. Deshaw, managing director, Ascot Lamps & Lighting, Ltd., when addressing a meeting of approximately 250 electrical wholesalers in London last week. The launching, which is at first to be confined to the Greater London area only, will begin on 19th November with a concentrated television and Press campaign.

The "Double-Life" lamp has a filament which is claimed to last 2,000 hours but costs only a little more than an ordinary lamp. The prices, including purchase tax, are 1s 11d (40 and 60 W) and 2s 3d (75 and 100 W).

## Diesel-Electric Locomotive Agreement

Associated Electrical Industries, Ltd., and Alco Products Incorporated, New York, announce that an arrangement has been made for joint collaboration in design, manufacture and sale of diesel-electric locomotives for world markets.

## Batti-Wallahs' Society

Some of the difficulties and mishaps in the laying of the first submarine telegraph cables were referred to by Mr. G. R. M. Garratt, Deputy Keeper of the Science Museum, London, at last week's luncheon of the Batti-Wallahs' Society, and in the course of an absorbing historical review of submarine telegraph cable laying he mentioned that the first cable—a single conductor—was laid across the English Channel in 1850. The first venture was unsuccessful and in the following year a heavier cable, with four conductors, was laid which functioned satisfactorily. Mr. Garratt spoke of the errors and mishaps, particularly through storms, in the laying of the first Atlantic cable, before this was successfully accomplished in 1866. Mr. J. Temple Hazell, the president, was in the chair, and Mr. J. W. Perkins (a past-president) proposed a vote of thanks to Mr. Garratt.

Batti-Wallahs should note that the next luncheon will be on Wednesday, 25th November, and not on Thursday of that week as previously arranged. The speaker will be Mr. Donald Campbell.

## T.U.C. and E.T.U.

A meeting has been arranged for 24th November between the General Council of the Trades Union Congress and the executive of the Electrical Trades Union to discuss certain aspects of E.T.U. activities. The General Council wishes to know why the E.T.U. has not proceeded against certain newspapers which have made allegations against it and questions are also to be asked about the Union's relationships with the Communist Party.

## Prices of Materials

In the accompanying table we give the basis prices of the more important materials used in the electrical industry. The figures given are the selling prices and are those quoted on Tuesday last.

| | |
|---|---|
| ALUMINIUM ingots | ton £180 0s 0d |
| COPPER, H.C. Electro | ton £252 10s 0d |
| Fire Refined 99·70% | ton £251 0s 0d |
| Fire Refined 99·50% | ton £250 0s 0d |
| COPPER Tubes .. | lb 2s 5½d |
| Sheet .. .. | ton £283 15s 0d |
| H.C. wire and strip .. | ton £310 5s 0d |
| LEAD, English .. | ton £71 15s 0d |
| Foreign .. .. | ton £70 0s 0d |
| MERCURY .. .. | flask £72 0s 0d |
| TIN, block (English) .. | ton £793 10s 0d |
| ZINC, G.O.B. Foreign | ton £95 15s 0d |
| BRASS Tubes (solid drawn) .. .. | lb 2s 0½d |
| Wire .. .. | lb 2s 9½d |
| PHOSPHOR BRONZE Wire .. .. | lb 4s 3d |
| PLATINUM .. .. | oz £28 10s 0d |
| RUBBER, No. 1 R.S.S. spot .. .. .. | lb 36½d (nom.) |

## Electricity in Hotels and Restaurants

At the British Hotels and Restaurants Association's conference at Harrogate, which has been held this week, a trade fair has also been held at which the British Electrical Development Association showed a selection of electrical appliances for hotel and restaurant kitchens, such as a chef's range, a rotary toaster, a wall mounted water boiler and a 12in stewpan. Back-bar units for snack counters included a 4-pot bain marie, a 4-plate boiling ring, a griddle plate and a fryer. Other electrical equipment, equally suitable for snack bar or kitchen, included a twin coffee unit, a rotisserie and an infra-red cooker.

For air conditioning two electric extractor fans were shown and there were also space heating appliances for private and public rooms in the hotel or restaurant.

## Electronic Equipment for Australia

Elliott Brothers (London), Ltd., a member of the Elliott-Automation group, and Siemens Edison Swan (Australia), Pty., Ltd., announce that they have received orders valued at over £120,000 sterling for the supply and installation of electronic recording and control equipment for the Cockle Creek works of Sulphide Corporation, Ltd., in New South Wales. The equipment to be supplied includes a completely integrated weight control and blending system regulating the feed of materials to an I.V. smelting furnace.

## Diesel Companies' Agreement

An agreement has been entered into between Auto Diesels, Ltd., and Frederick Braby & Co., Ltd., whereby Auto Diesels, Ltd., and its subsidiaries, Diesel Equipment, Ltd., and Norman Industrial & Marine Co., Ltd., have become members of the Frederick Braby group. Mr. F. Braby and Mr. C. Braby have joined the Auto Diesels board and Mr. A. J. W. Green and Mr. L. W. Parncutt have been elected to the Braby board.

## Price Reductions

Electrolux, Ltd., announces a reduction of £3 10s 11d in the price of its model 60 suction cleaner; the new price is £18 18s (including £2 18s 5d p.t.). The price of model 62 suction cleaner, £27 12s 6d (including £4 5s 5d p.t.), is unchanged.

The prices of the photoflash bulbs of the A.E.I. Lamp & Lighting Co., Ltd., with the exception of the "Mazda" No. 1 flashbulb, have been reduced. "Mazda" No. 1B (blue) bulbs are reduced from 9d to 8d, No. 5 bulbs from 1s to 9d, and No. 5B (blue) from 1s 1d to 10d.

## Electric Heating Exhibition

All the latest methods of heating the home, the office and the factory by electricity have been on display at a public exhibition on the theme "Electricity for Winter Warmth and Clean Air" which has been held at the Bluecoat Chambers, Liverpool. The exhibition was opened by the Lord Mayor (Alderman H. N. Bewley) on 28th October. It has been organised by the Merseyside and North Wales Electricity Board, in co-operation with the Liverpool Corporation Health Department, electrical manufacturers, contractors and retailers, including leading Liverpool stores. The establishment of smokeless zones as part of the clean air campaign means that smokeless fuels

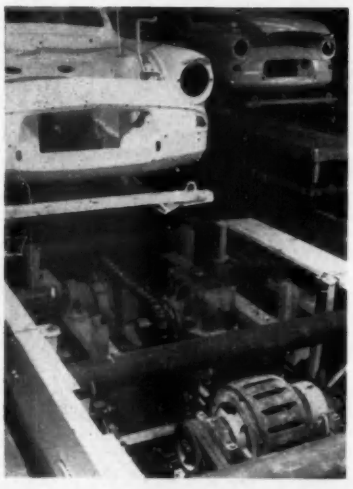
must be used, and one of the exhibits on display is an electric firelighter, developed by the General Electric Co., Ltd., which will light solid smokeless fuels in a few minutes by blowing a jet of hot air on to the fuel which quickly reaches ignition temperature. This firelighter—the first of its kind to be shown to the public—is a prototype. Among electrical heating methods displayed are floor-warming, block storage heaters, heated carpet underlays, infra-red heaters for kitchens and bathrooms, and electric fires and convectors of all types.

### Nuclear Power Collaboration

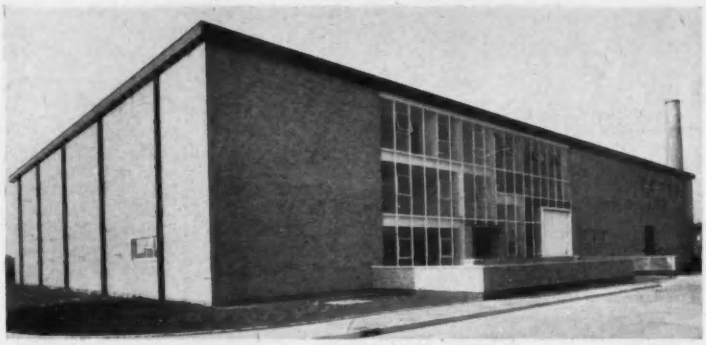
Humphreys & Glasgow, Ltd., announce that their agreement with Alco Products, Incorporated, New York, in connection with nuclear power station units of up to 30 MW capacity, has been terminated by mutual consent. Humphreys & Glasgow, Ltd., are prepared to offer a similar range of comprehensive power stations incorporating pressurised water reactors designed and manufactured by Babcock & Wilcox, Ltd.

### Variable Speed Drives

All variable speed couplings and related electronic control gear for the 175 separate conveyors at the Ford Motor Co.'s new £10 million paint, trim and assembly building at Dagenham were supplied by Heenan & Froude, Ltd., Worcester. The couplings—air cooled Heenan-Dynamatic controlled slip models—have been installed in five different sizes to suit the varying power requirements involved. The bulk of them are under group control from the main control rooms, one on each of the two floors, the remainder being operated from local control panels sited throughout the plant. A feature of the layout is that the speed of each conveyor in any one group may be individually trimmed by means of potentiometers on separate panels in the main control rooms while the entire group remains under the master control of the main control panel.



*A Heenan-Dynamatic coupling in use with one of the paint shop conveyors at the Ford Motor Co.'s new paint, trim and assembly building, Dagenham*



*The new factory of Jones, Stroud & Co., Ltd.*

In a plant such as Ford's, where it is frequently necessary to transfer a motor body from one conveyor to another at various stages of assembly, a high degree of synchronisation is required. The Heenan & Froude method of positively synchronising a number of drives at a transfer junction involves the use of differential voltage signals derived from magslips, one magslip being positively driven from each conveyor.

### Floor Warming Association

The Electrical Floor Warming Association, which was formed a year ago, held a meeting on 27th October, when Mr. R. F. Weaire was appointed chairman for the ensuing year in succession to Mr. E. C. Green. The address of the Association will remain at 94-98, Petty France, London, S.W.1. Following the meeting there was a discussion on controls in relation to floor warming. Members felt that there was a demand for thermostats of higher rating than at present, and the control manufacturers should conduct research into the possibility of producing thermostats capable of controlling loads up to 30 A. It was generally agreed that more research was necessary into the possible benefits of various forms of external control for use with thermal storage installations. Discussion also took place on the relative proportions of convection and radiation in an installation, and the importance of producing thermostatic controls which would react equally to both these heating media.

### Glass Insulation Agreement

Jones, Stroud & Co., Ltd., announce that as from 1st November they have taken over the whole of the glass tape weaving operation previously undertaken by Fibreglass, Ltd., at the latter's Glasgow factory. The plant and equipment will be housed in a new factory with a production area of 30,000 sq ft, which has been built approximately a mile from the company's present tape mill at Long Eaton, Nottingham. When in full operation this factory, which has cost over £250,000 to build and equip, will produce amongst other things over a million yards of glass tape per week. Jones, Stroud & Co. make the "Vidaflex" range of class E, B, F and H electrical insulation materials. A recent development in the range has been the introduction of a glass-based oven door seal for electric, gas and solid fuel cookers.

Arrangements have been made to ensure continuity of supplies to customers hitherto dealing with Fibreglass, Ltd., as follows:—Fibreglass will fulfil all orders on their books at 1st November and will also accept orders up to 30th November and will be responsible for delivery. From 1st December new orders should be forwarded to Jones, Stroud & Co., Ltd.

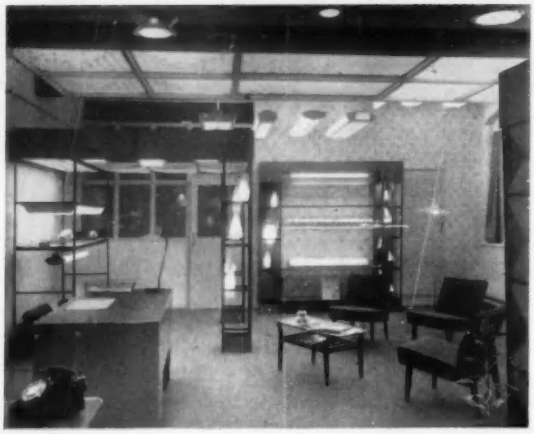
### Electricity Supply Scholarships

*Joint Consultation*, a magazine produced by the National Joint Advisory Council of the Electricity Supply Industry gives some particulars of the industry's scholarship scheme instituted in 1952. Almost 1,000 applications for scholarships have been received since the scheme started and 87 have been awarded: 33 to manual workers, 32 to technical staff and 22 to clerical and administrative employees.

Awards have been made for a wide variety of courses leading to first and second degrees, professional qualifications, special subject diplomas, national diplomas and diplomas in technology. The subjects have included electrical and mechanical engineering, building construction, economics, law and personnel management. Among the successes recorded are the gaining of the following degrees:—One Ph.D., two M.Sc., eleven B.Sc.(Eng.), two M.Sc.(Econ.), five B.Sc.(Econ.) and four LL.B.

### New Lighting Showrooms

A new office and showrooms have recently been opened by Courtney, Pope (Electrical), Ltd., at 17, Wellington Street, Leeds (telephone: Leeds 3-4549). This new branch office will



*The new showroom of Courtney, Pope (Electrical), Ltd., at Leeds*

provide a closer service for customers in the Leeds area, and a wide variety of both tungsten and fluorescent fittings are on display in the new showrooms. The area manager is Mr. P. T. Hookway.

### Film on Lead

The Lead Development Association has produced a film on lead and its uses, which had its *première*, before a representative audience, at the Royal Society of Arts, London, on 26th October. Intended to interest non-technical audiences, the film has been designed to offer general information on lead. After briefly tracing its history and ancient usage, there is a description of the metal's occurrence in the world today and how it is mined, smelted and refined. The main sequences demonstrate the versatile role played by lead in the modern world and deal with applications which include sheet and pipe for building, paints, chemical engineering, lead shot, grids and oxides for storage batteries, type metals for printing, solder, electric cable sheaths and lead glass. Lead's enduring properties and its ability to resist corrosion are demonstrated in connection with its use in several fields. The metal's power to protect against harmful radiation hazards is described with particular reference to hospital and atomic energy plant and equipment. A closing sequence suggests that further new uses for lead will evolve as scientific discovery progresses. The running time of this sound film (16 mm) is 28 minutes, and it is in colour. Copies are lent free of charge on application being made to the Lead Development Association, 18, Adam Street, London, W.C.2.

### Works Visits

Four Vietnamese guests of the Foreign Office are in this country, making a one-month tour of various industrial manufacturing concerns. Their visit, in connection with a five-year development plan for Viet Nam, has been arranged to enable them to look at and investigate methods of British industry and also to study this country's way of life in general. The visitors are Mr. Nuynh Van Diem, director general of the five-year development plan; Dr. Do Van Tra, chief of the Supplies Department of the Ministry of Public Works; Mr. Cung Gin Hung, director of the Saigon Bus Corporation; and Mr. Nghiem Manh Ky, engineer-in-charge of the Agricultural Development Commission. Their itinerary included a visit to the Rugby Works of the British Thomson-Houston Co., Ltd., on 22nd October, the arrangements being made by A.E.I. Export, Ltd., Rugby office.

The Mayor and Mayoress of Bolton, the street lighting superintendent and approximately thirty members of the Bolton Corporation, including the whole of the Street Lighting Committee, recently visited the cable works of Permanoid, Ltd. The party was entertained to lunch in Manchester and after touring the two Permanoid factories they had dinner at the Lymm Hotel in Cheshire.

### Car Radiophone Service

The inaugural call on the new South Lancashire car radiophone service was made on 28th October by the Postmaster General, the Rt. Hon. Reginald Bevins. This service will enable subscribers whose vehicles are fitted with suitable radio equipment to make and receive calls from any telephone on the United Kingdom network. It will operate from the Peterloo Exchange, Manchester, through two base stations at Winter Hill, near Horwich, and Lancaster House, Liverpool. There is also an auxiliary receiving station in Manchester. Between them these stations will cover the southern half of Lancashire, the Wirral and parts of North Cheshire.

The system employs frequency-modulated equipment on five two-frequency channels. One channel is for calling and will be used everywhere in the service area as the link between the vehicle and the exchange operator. Conversations will take place on a channel indicated by the exchange operator to the person in the vehicle making or receiving the call.

The car equipment will generally consist of a telephone handset to enable the occupant to hold a conversation with the distant subscriber, and a calling loudspeaker so that the exchange operator can make contact with the car. The radio licence fee for the service will be £7 10s a quarter, and a three-minute call within the main area of radio coverage will cost 2s 6d. Calls outside the radio service area will be charged at ordinary trunk rates, plus 2s radio charge for a three-minute call.

### Walking Dragline for Canada

Ransomes & Rapier, Ltd., have received an order from Calgary Power, Ltd., Alberta, for a large electrically driven walking dragline. The machine, known as the Rapier W1350, weighs 1,400 tons and will be equipped with a 33 cu yd bucket capable of carrying 50 tons of material at a time at a radius of 215ft. The dragline will be manufactured at Waterside Works and after dismantling into units will be shipped to Vancouver and taken through the Rockies by rail to the assembly area at Wabamun, near Edmonton. It is expected to be working by the middle of 1962 and will be used for removing overburden on top of 750,000 tons of coal required each year for power stations in the vicinity. The very low temperatures in which the dragline must work in the winter-time set many interesting problems of design and construction. Special steels will be used to meet these conditions.

### Institute of General Managers

The president of the Federation of Commonwealth and British Empire Chambers of Commerce, Lord Lloyd, M.B.E., and the High Commissioner for the Union of South Africa, Dr. A. J. R. van Rhijn, will be the principal speakers at the fourth annual dinner of the Institute of General Managers to be held at the Savoy Hotel, London, on Friday, 27th November.

### "Electrical Review" Index

Owing to the recent printing dispute, production of the index to Volume 164 of the *Electrical Review* (January-June, 1959) was unavoidably delayed. Copies are, however, now available and any readers desiring them should apply to the Publishers, *Electrical Review*, Dorset House, Stamford Street, London, S.E.1.

### Trade Announcements

On 1st November the business formerly carried on by the Electrical Contracting Department of **Vallance & Davison, Ltd.**, Leeds, was taken over by a new company called Vallance Electrical Engineers, Ltd. There will be no change in the administrative policy or staff, and Mr. W. Hall, who has been the manager of this department for many years, has been appointed a director of the new company.

A new service station of **Leo Computers, Ltd.**, has been installed at Hartree House, 151a-159a, Queensway, London, W.2 (telephone: Bayswater 9451-8), where the offices of the general manager and Marketing and Programming Divisions are also situated.

# INDUSTRY AND THE HOUSE

*The New Parliament Opens*

By AUSTEN ALBU, B.Sc.(Eng.), A.M.I.Mech.E., M.P.

LACKING its traditional ceremonial opening, the new Parliament met in a mood of strange contrast with the excitement of the Election weeks. The Government and its supporters seemed over-awed at the majority with which the electorate had endowed them, while the Opposition, chastened by its third successive defeat, displayed less than its usual divisory tendencies. Barring accidents, this Parliament will run nearly its full life of five years, and no one can foresee the rocks and rapids which the Government will have to negotiate during those years; but neither does anyone believe that all will be plain sailing, whether at home or abroad, in matters economic or political.

The new Speaker, with a reputation for sense and good humour, has already indicated by his actions his intention to try to exercise his influence in enlivening debates and, in doing so, has already been reminded, by those indefatigable defenders of private members' rights who sit below the gangway on the Opposition side, that he is the servant of the House from whose standing orders he may not deviate.

Unless the biographies of the one hundred and thirty new members reveal some unlikely talents, it looks as if the new House will have two fewer professional engineers than the old. On the Opposition side my predecessor in these columns, Mr. Arthur Palmer, lost his seat at Cleveland; and since the Election, Sir Albert Braithwaite, who was a civil engineer, has died. Mr. F. J. Erroll, now Minister of State at the Board of Trade, is an electrical engineer, and an earlier contributor of this commentary.

## Debate on the Queen's Speech

The first clash on economic and industrial affairs took place on the second day of the traditional debate on the Address to the Queen, thanking her for her Gracious Speech. That the Opposition did not think much of the programme outlined in the speech was, perhaps, a foregone conclusion. Mr. Harold Wilson repeated his well-known arguments about the lack of expansion of the economy during recent years and pointed out that the present balance of payments surplus was largely accounted for by a decrease in the value of our imports last year, due to a fall in prices, of £336 million. He warned the Government that, unless there was a revival in industrial investment, the present boom in consumer goods would lead to trouble. Already the increased demand for steel sheet, which would make itself effective when the American strike was over, would add to the import bill.

Mr. Maudling, replying for the first time as President of the Board of Trade, claimed that it was Government policies which were themselves partly responsible for the fall in import prices. The policies of this country, which is one of the main importing countries of the world, had an effect on the level of import prices. He quoted figures to show that the outputs of steel and chemicals were up at least as much as those of textiles and clothing, while the output of commercial vehicles had risen 44 per cent.

The real problem which neither side squarely faced is whether, if there are now dangers of a capital investment boom superimposed on a consumer goods boom and so of a revival of the situation which followed the Election of 1955, it would have been possible to tell the voters so during the Election. For they might have drawn the conclusion that whoever won might sooner or later be forced to take steps to restrict the credit which at present flows so freely into their pockets; but this would undoubtedly have been unpopular. There are, in fact, signs that it was the fear that a Labour Government might do this which influenced many voters to turn against them.

## Economic Policy

The most interesting part of the President's speech was his outline of the Government's external economic policy. He affirmed that an increase in our export trade was one of the Government's major objectives. He pointed out that, as more and more countries industrialised, competition at home and overseas would grow. We should, therefore, have to find new industries, new products in existing industries and more highly developed and sophisticated methods of production. The Government aimed at removing all possible barriers to trade and payments in the world; and this meant continuing to support international institutions like G.A.T.T. and the International Monetary Fund. He emphasised, nevertheless, that the Commonwealth remained the first priority in all our trade policies; but this seemed to conflict with his subsequent remarks about our relationship with Europe and, in particular, with the Stockholm " Seven " and the Rome " Six."

It cannot be said that the outlines of the Government's trade policy are yet firm, but they are certainly moving in the direction of freer trade and payments. Their actions over the cotton industry have shown that they will not protect an industry which is radically inefficient, but are prepared to take some action to assist its contraction. It is not surprising that many Opposition Members of Parliament, representing constituencies with traditional industries and with long memories of the miseries of closed mills and pits in the past, are highly critical of what is taking place. It will be a real test both of the Government's humanity and statesmanship to carry through their policy without creating serious unemployment and with the support of the trade unions concerned. It is not industries that need protecting from industrial change, but men and women. An opportunity to debate the problems here involved will occur when the Local Employment Bill receives its second reading, to which two days are to be devoted.

Closely allied with the question of industrial change are the problems of research and development. Members are already showing interest in the functions of the new Ministers of Science and of Aviation. In addition to aircraft and missiles, the latter is to have responsibility for radar and other electronic equipment. Most of the other functions of the Ministry of Supply are transferred to the War Office. The performance of Lord Hailsham in his new post is awaited with a certain exhilarating anxiety.

# Switchgear Supervision and Control

A SYSTEM enabling a central control room to supervise switchgear in unattended substations without using private or rented telephone lines has been developed in co-operation with the Central Electricity Generating Board by Sound Diffusion (Auto-Thermatic), Ltd., of Portslade. Since the information is transmitted in a verbal form, the equipment has been approved by the G.P.O. for operation in substations up to 132 kV on the normal public telephone network, and the control room requires only a standard G.P.O. telephone as neither decoding nor display gear is necessary.

The "Datafonic" equipment is an automatic two-way calling system. It can be interrogated at any time by calling the unattended site telephone on the public system and it will dial the number of the central control room if any

*Interior of the Mark I "Datafonic" equipment*

change of state occurs in the apparatus being supervised. The standard system can select and transmit 40 units of information, supervising up to 20 circuit-breakers, since these are two-position devices, or any combination of equipment, for example 19 breakers and two Buchholtz alarms. If meters with preset limit contacts are connected to the substation's voltage and current transformers, a warning can be transmitted when out-of-limit conditions are reached, and the condition of the substation's tripping battery can also be supervised in a similar manner.

A suitably pre-recorded disc runs through all the statements in sequence, those corresponding to the present state of the equipment under supervision being electrically selected for transmission. Each statement takes approximately three seconds. If a breaker trips, auxiliary contacts operate a "fleeting start" in the equipment, causing relays to close the G.P.O. line and dial the control room number. At the end of the dialling sequence, the first verbal statement transmitted is a repeated announcement giving the number and identity of the substation. Then further statements, selected by the position of auxiliary contacts on the breakers, describe each individual breaker condition. An acknowledgment signal at the end of the message transmission consists of a three-second duration audio tone generated by a transistor oscillator attached to the control engineer's telephone. If no acknowledgment signal is received, the equipment re-calls the control room after a period of approximately three minutes. The acknowledgment signal can be produced by whistling into the telephone mouthpiece, enabling engineers to interrogate the equipment from a call box telephone. Should a change of state of supervised equipment occur during a message transmission, the equipment re-calls the control room immediately the transmission is concluded. The plug-in chassis for the relay's "fleeting start" circuit and auto-dialler are mounted in an air-sealed cabinet. The 45 r.p.m. record playing deck operates from a 7·5 V d.c. supply and incorporates a mechanism which lifts the pick-up arm from the recording and returns it to the starting position. If the calls average two or three a week, the equipment can be powered by a 50 V dry cell battery, but for more frequent use a trickle charged nickel alkaline battery can be supplied.

A Mark II system is available offering control and telemetering in addition to supervisory facilities. A panel in the control centre incorporates indicator lights, a circuit-breaker selector switch, a trip/make switch and an indicating meter. With this equipment, a 50 V supply is required at the control point. The supervisory equipment can be converted to the Mark II system by the addition of the appropriate units.

## Employment in Development Areas

UNDER the Government's new Local Employment Bill three professional management corporations, one each for England, Scotland and Wales, are to be set up to supervise the proposed new measures for promoting employment in localities "where high unemployment exists or is imminent and is likely to persist." They will manage all the Board of Trade's industrial property, both in the existing development areas, where the five industrial estate companies are to be disbanded, and in the new areas.

The other major new provision of the Bill permits the Board of Trade, to whom the power to make loans and grants is to be transferred from the Treasury, to make grants to firms towards the capital cost of building their own premises. The grant will be at a flat rate of 85 per cent of the difference between the estimated cost of a suitable building and the estimated value of it when completed. This is aimed at the larger firms which prefer to design and own, rather than rent, factories. In future, also, applicants for loans will no longer have to show that they cannot obtain finance from other sources on the requisite terms.

Grants or loans will be made by the Board of Trade in accordance with the recommendations of an Advisory Committee, appointed by the Board, to persons carrying on or proposing to carry on undertakings in localities of high unemployment. The advisory committee which takes over the functions of the Development Areas Treasury Advisory Committee (D.A.T.A.C.) will also co-ordinate the activities of the Boards. It will consist of the chairmen of the three management corporations and two other members.

Inducements to firms to move to those areas where jobs are needed are to be given through a tightening-up of conditions relating to the granting of industrial development certificates under the Town and Country Planning Acts. A certificate will now also be required when it is proposed to change a building from non-industrial to industrial use, and for certain extensions to industrial buildings.

The Board of Trade's powers to clear derelict land are extended to apply to land which is "neglected or unsightly," and the power to make grants to local authorities to help clear derelict sites will be vested in the Ministry of Housing and Local Government and will also enable land to be bought. Other existing powers are continued; in particular, the powers to make grants for the improvement of basic services and the powers of the Minister of Labour to assist the transfer and re-settlement of key workers.

# Electric Power Equipment in Europe

## O.E.E.C. SURVEYS OF INSTALLATIONS, PRODUCTION AND ORDERS

IN contrast to the widespread slackening of economic activity in 1958, deliveries of heavy electric power equipment by European manufacturers rose to record levels. The greater part of this increase was due to larger shipments to non-European markets, but during the current year substantially greater shipments are expected to both home and export markets and total deliveries should reach a new peak. New orders have not, however, except for boilers, been keeping pace with deliveries, and work on hand at the beginning of 1959 was the same or below the level of a year earlier.

These are among the trends revealed by the "12th Survey of Electric Power Equipment" published by the Organisation for European Economic Co-operation (price 10s). The first part of this 132-page volume deals with the probable growth in the installation of plant in all 18 member countries. The second part provides statistics of deliveries during 1958, orders on hand, production capacity and the ratings of the largest units built or under construction. For the first time separate data are given for turbo-alternators above 100 MW and for gas turbines and nuclear plant. The tables here are based on information supplied by 11 countries which together account for practically all the production of heavy equipment for power stations in O.E.E.C. countries.

Last year the thermal plant installed by member countries of O.E.E.C. (5,547 MW) was slightly less than the figure achieved in 1957 and considerably below the estimate of 6,387 MW. Information supplied for the survey indicates that the whole of the deficiency will be made up this year with a return to a more normal level in 1960. It is thought more realistic, however, to expect a spread over the two years, bringing the new capacity installed in each to between 7,000 and 7,500 MW.

Units of 100 MW and over accounted for 4,103 MW out of the record total of 9,643 MW steam turbine alternators delivered during 1958, but only one of these, a 200 MW unit, was sent to a non-member country. The importance of larger sets in the export market is, however, growing. Deliveries of these alternators is expected to reach nearly 1,000 MW this year, and orders received for delivery in 1960 and 1961 already exceed 1,600 MW and 1,000 MW respectively. Orders for alternators received during 1958 (9,572 MW) were less than in each of the two previous years, and barely equalled actual deliveries. But because certain deliveries were behind schedule the total of orders on hand at 1st January, 1959 (31,361 MW) was practically the same as a year earlier. The same is true of steam turbine deliveries and orders. Actual deliveries in 1958 rose by 639 MW to the record level of 8,986 MW. The further sharp increase expected this year, to 12,524 MW, is almost entirely due to turbines of 100 MW and above, which, if targets are met, will represent 56 per cent of total deliveries.

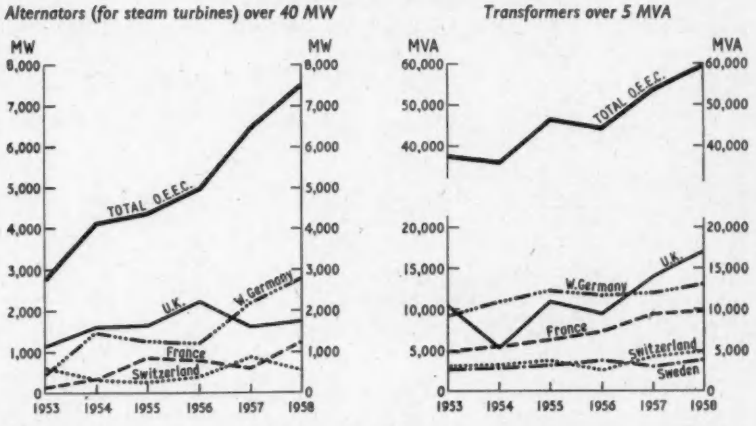
Boilers installed for power plants reached the record total of 33,621 tons/hr, the increase of 10 per cent being attributed to increased installations in non-member countries. New orders also increased sharply in 1958, bringing orders on hand up to 93,026 tons/hr.

### Hydro-Electric Plant

Contrary to the position with regard to thermal plant there is no clear tendency towards any increase in new hydro capacity. Plant totalling 2,578 MW was installed in 1957 and a further 3,443 MW in 1958, but estimates for the following three years show a slight decrease. This trend is confirmed by the orders received for alternators and turbines which were below deliveries, though the decrease in fresh orders is less pronounced for non-member countries. Deliveries were also less than estimated, but nevertheless the actual deliveries of alternators, at 4,941 MW, reached the highest level since the war; deliveries of turbines, at 6,137 MW, were slightly below the figure achieved in 1957. Orders on hand at the beginning of this year amounted to 14,377 MW for alternators and 18,515 MW for turbines.

Deliveries of power transformers (5 MVA and over) also reached the record level of 59,315 MVA in 1958. Of the increase of 6,007 MVA over 1957 all but 460 MVA was shipped to non-member countries. Orders on hand at the beginning of the year amounted to 76,911 MVA, 713 MVA less than a year earlier. The report includes a summary of the new transmission lines commissioned or planned between 1957 and 1962 and reveals the steady growth of networks operating at 220 kV and 380 kV.

**DELIVERIES OF POWER PLANT**




Nuclear power has not yet made an impact on the electricity supply position. In 1958 the United Kingdom was the only European country with power reactors in service. Fourteen stations totalling 2,000 MW are, however, included in the programmes up to 1962. Gas turbines are being increasingly used for power plants. Deliveries in 1958 amounted to 306 MW.

DOMESTIC ELECTRICAL EQUIPMENT

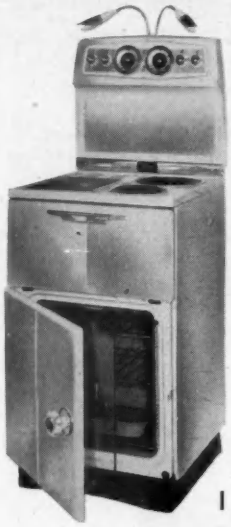
# ELECTRIC COOKERS

IT is estimated that the number of electric cookers at present in use in this country is just over four million. This figure now represents nearly 27 per cent of the total number of wired households and, what is more important, is steadily increasing.

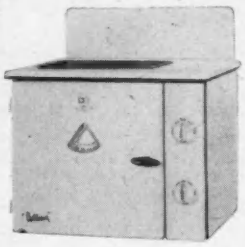
The growing public preference for electric cookers can be attributed to several factors—greater cleanliness, due to the absence of products of combustion; the fast-heating radiant type boiling plates which have either replaced or supplemented the slower solid type plate (one of the chief objections to an electric cooker); and the introduction of automatic controls. Fully automatic cookers or models that can easily be adapted by the fitting of a control panel are produced by almost all of the electric cooker manufacturers. Glass inner oven doors, interior oven lights, a choice of several colours for the hobs, eye-level grills, and many other refinements are also developments which have occurred during recent years—in fact, the electric cooker that was known to pre-war users bears little resemblance to its modern counterpart.

Two of the latest cookers introduced by Simplex (Creda) and Allied Ironfounders suggest that there may be a trend towards four-plate models. The Creda "Mercury Four" is provided with four "Quick-Disc" boiling plates, each with a normal loading of 1·6 kW, which can be individually boosted to 3 kW with automatic regulators to give really fast boiling. The other recently introduced cooker is the Allied Ironfounders "Falco Royalty," a four-plate automatic model with radiant plates, eye-level grill and convected oven heating.

| Manufacturer | Name or Model | Type | Size (H.W. & D. in inches) | Oven Type | Oven Size (H.W. & D. in inches) | Oven Loading | Type of Element | Oven Control |
|---|---|---|---|---|---|---|---|---|
| ALLIED IRONFOUNDERS, LTD., Electrical Appliance Division, 28, Brook Street, London, W.1. | Falco "Royal" Mark IV | Vertical, plinth | 49×23×23½ (36in to top of hob) | Removable (5-piece) | 16½×17½×15½ | 3,500 W | Sheathed plug-in | Thermostatic and auto-timer |
| | Falco "Royal" Mark III | Vertical, plinth | 49×23×23½ (36in to top of hob) | Removable (5-piece) | 16½×17½×15½ | 3,500 W | Sheathed plug-in | Thermostatic and auto-timer |
| | Falco "Royalty" Mark IV | Vertical, plinth | 57×23×23½ (36in to top of hob) | Removable base | 16½×17⅞×17 | 2,500 W | Plug-in ceramic and sheathed | Thermostatic and auto-timer |
| | Falco "Royalty" Mark III | Vertical, plinth | 57×23×23½ (36in to top of hob) | Removable base | 16½×17⅞×17 | 2,500 W | Plug-in ceramic and sheathed | Thermostatic and auto-timer |
| | Falco "Freedom" | Vertical, plinth | 36×22½×19½ | Removable (3-piece) | 13×13×14½ | 2,400 W | Plug-in ceramic | Thermostatic and auto-timer |
| | "Moray" | Vertical, plinth | 42×20×22 (36in to top of hob) | Removable sides | 14×14×14⅝ | 2,500 W | Plug-in ceramic | Thermostatic |
| | 16B | Vertical, plinth | 36×22½×19½ | Removable (3-piece) | 13×13×14½ | 2,400 W | Plug-in ceramic | Thermostatic |
| BELLING & CO., LTD., Southbury Road, Enfield, Middlesex. (continued on next page) | 47AB | Vertical | 36×21×21 | Removable (one-piece) with roof lining | 16×13×13 | 2,500 W | — | Thermostatic |
| | 48AB and 48T | Vertical | 54×21×22½ | Removable (one-piece) with roof lining | 16×15×13 | 3,000 W | — | Thermostatic |
| | 59T | Vertical | 54×21×22½ | Removable (one-piece) with roof lining | 16×15×15 | 3,000 W | — | Thermostatic |
| | 45A "Baby Belling" | "Baby" | 21×18×15½ | Fixed | 11½×13×13 | 1,200 W | — | Three heat |



1. *Belling model 59T "Classic" cooker*
2. *Belling model 52 "Baby" cooker*
3. *Allied Ironfounders "Falco Royalty" 4-plate cooker*



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| Hot Plates | Grill or Grill Boiler | Hot Cupboard or Grill Compartment (H.W. & D. in inches) | Storage Drawer (H.W. & D. in inches) | Storage Drawer Loading | Special Features | Finish | Price |
|---|---|---|---|---|---|---|---|
| Two 8in radiant 2 kW each Two 6½in radiant 1·2 kW each Simmer control | 3 kW grill Simmer control | 4×17½×16 | — | — | Auto-timer control with warning pinger on both oven and R.H. 8in hotplate | White, cream, pastel blue and pastel green | £92 8 0 (oven light £2 extra; plate rack £3 extra) |
| Two 8in radiant 2 kW each One 6½in radiant 1·2 kW Simmer control | 3 kW grill Simmer control | 4×17½×16 | — | — | Auto-timer control with warning pinger on both oven and R.H. 8in hotplate | White, cream, pastel blue, and pastel green | £84 0 0 (oven light £2 extra; plate rack £3 extra) |
| Two 8in radiant 2·2 kW each Two 6½in radiant 1·4 kW each Simmer control All hob mounted | 2 kW grill Simmer control | Full width grill shelf | 3⅞×16½×15 | 250 W | Auto-timer, convector oven, inner glass oven door, oven light, built-in plate rack | White, cream, pastel blue | £74 0 0 |
| Two 8in radiant 2·2 kW each One 6½in radiant 1·4 kW Simmer control All hob mounted | 2 kW grill Simmer control | Full width grill shelf | 3⅞×16½×15 | 250 W | Auto-timer, convector oven, inner glass oven door, oven light, built-in plate rack | White, cream, pastel blue | £68 0 0 |
| One 8in solid 1·8 kW Simmer control One 6½in solid 1 kW three heat | 10½×8 grill boiler solid 2 kW | 5×18×13¼ | 5½×16½×17 (unheated) | — | Auto-timer, warning pinger radiant plates and additional "Simmerstats" optional extras | Cream or white with cream, white or black hob | £46 13 0 |
| One 8in radiant Simmer control (plus one 6½in solid on 3-plate model) | 10½×8 grill boiler 2 kW | 6×12×16½ | Storage drawer £1 18s extra | — | Cast-iron and sheet steel construction | Cream, white or pastel blue | £34 19 0 (3-plate) £32 7 6 (2-plate) |
| One 8in solid 1·8 kW One 6½in solid 1 kW three heat | 10½×8 grill boiler 2 kW | 5×18×13¼ | 5½×16½×17 (unheated) optional extra | — | Drop-down door, self-indicating switch knobs, radiant plates and additional "Simmerstats" optional extras | Cream, green and cream, white with cream, white or black hob | £30 0 0 |
| One 8in radiant 2 kW ("Simmerstat" controlled) and one 6½in solid 1 kW (three-heat control) | 10½×8in 2·3 kW grill boiler | 7×18½×18½ | 4×16×15 | — | Inner glass door | White or cream (coloured hobs available) | £37 15 0 |
| One 8in radiant 2 kW ("Simmerstat" controlled) and one 6½in solid 1 kW (three-heat control) | 10½×8in 2·3 kW grill boiler | 7×18½×18½ | 4×16×14½ | — | Inner glass door, floodlit oven (48T has clock timer) | White or cream (coloured hobs available) | £45 15 0 (48AB) £51 0 0 (48T) |
| One 8in and one 6½in radiant ("Simmerstat" controlled) | 10½×8in 2·3 kW grill boiler | 9×19×19 | — | — | As 48T plus hoblight, concealed wheels, extra timer, heated hot cupboard, large oven, etc. | White or cream (coloured hobs available) | £66 10 0 |
| — | 10½×8in 2 kW grill boiler | 4½×17½×15 | — | — | Available on stand (£2 7 6 extra) or cabinet (£4 15 0 extra) | Cream vitreous enamel | £16 0 0 |

| Manufacturer | Name or Model | Type | Size (H.W. & D. in inches) | Oven Type | Oven Size (H.W. & D. in inches) | Oven Loading | Type of Element | Oven Control |
|---|---|---|---|---|---|---|---|---|
| **BELLING & CO., LTD.,** Southbury Road, Enfield, Middlesex. *(continued)* | 51 "Wee Baby Belling" | "Baby" | 12×13¾×11⅛ | Fixed | 9⅛×9×9⅛ | 600 W | — | Three heat |
| | 51H "Twin Baby Belling" | "Baby" | 12×21×13 | Fixed | 9¼×9×9⅛ | 600 W | — | Three heat |
| | 52 "Baby Belling" | "Baby" | 14×17×16 | Fixed | 11⅛×11⅛×11⅛ | 1 kW | — | Three heat |
| | 53 "Big Baby Belling" | Stand or cabinet | 36×21×16 | Fixed | 11⅛×11⅛×11⅛ | 1,000 W | — | Three heat |
| | 29 | Table | 9⅛×16⅛×12 | — | — | — | — | — |
| | "53-Plus" | Stand or cabinet | 48⅛×21×20 | Fixed | 11⅛×11⅛×11⅛ | 1,000 W | — | Thermostatic |
| | "47T" | Vertical | 49⅛×21×23 | Removable (one-piece) | 16×13×13 | 2,500 W | — | Thermostatic |
| **CARRON COMPANY,** Carron, Falkirk. | L.2 | Vertical, legs or plinth | 36×22×21 | Fixed with single element in bottom | 12⅜×14⅞×14 | 2,400 W | Plug-in special finned sheathed type | Thermostatic |
| | L.3 | Vertical, legs or plinth | 36×22×21 | Fixed with single element in bottom | 12⅜×14⅞×14 | 2,400 W | Plug-in special finned sheathed type | Thermostatic |
| | L.75 | Plinth | 36×22×21 | Fixed with single element in bottom | 12⅜×14⅞×14 | 2,400 W | Plug-in special finned sheathed type | Thermostatic |
| **CREDA (SIMPLEX ELECTRIC CO., LTD.),** Creda Works, Blythe Bridge, Staffs. *(continued on next page)* | "Carefree" | Vertical | 53½×21×25 (36in to top of hob) | Fixed, removable sides | 15⅛×14×14½ | 2,500 W | Tubular sheathed | Thermostatic |
| | "Stargazer" | Vertical | 43½×18½×23½ (36in to top of hob) | Fixed, removable sides | 13⅞×12⅛×14⅛ | 2,200 W | Tubular sheathed | Thermostatic |
| | "Super Comet" D.H.6 | Horizontal | 50⅛×36½×25½ (36in to top of hob) | Fixed, removable sides and base | 15×14½×16⅛ | 3,450 W | Tubular sheathed | Thermostatic |

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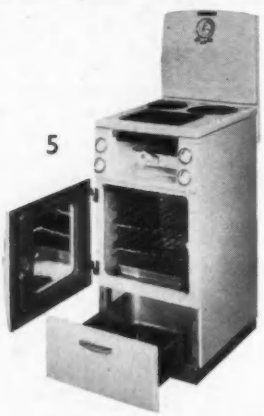

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| Hot Plates | Grill or Grill Boiler | Hot Cupboard or Grill Compartment (H.W. & D. in inches) | Storage Drawer (H.W. & D. in inches) | Storage Drawer Loading | Special Features | Finish | Price |
|---|---|---|---|---|---|---|---|
| — | 9×7in 1·5 kW grill boiler | — | — | — | — | Cream vitreous enamel | £8 12 0 |
| One 6½in solid 1 kW | 9×7in 1·5 kW grill boiler | 6×9×9½ | — | — | Stand £2 5 0 extra | Cream vitreous enamel | £15 15 0 |
| — | 10×7in 2 kW grill boiler | — | — | — | Stand £2 5 0 extra | Cream vitreous enamel | £13 15 0 |
| One 8in solid 1·8 kW | 10×7in 2 kW grill boiler | 5×19×14 | — | — | Switch interlock limits load to 3 kW | Cream vitreous enamel | £21 7 6 (on stand) £23 10 0 (on cabinet) |
| — | 10½×8in 2·3 kW grill boiler | 7×10⅝×12⅝ | — | — | Three heat or "Simmerstat" control | Cream vitreous enamel | £7 19 6 (three heat) £8 15 0 ("Simmerstat") |
| One 8in solid 1·8 kW | 10×7in 2 kW grill boiler | 5×19×14 | — | — | Auto-oven timer, built-in timer and pilot light | Cream vitreous enamel | £33 4 0 (on stand) £35 7 0 (on cabinet) |
| One 8in solid 2 kW "Simmerstat" controlled, one 6½in solid 1 kW three heat | 10½×8in 2·3 kW grill boiler | 6×18⅝×15⅝ | 4×16×15 (unheated) | — | Auto-oven timer, built-in timer and clock | Cream vitreous enamel (coloured hobs available) | £45 0 0 |
| One 8in solid 1,800 W "Simmerstat" control | 10½×8in solid 2 kW grill boiler | 5×19×15 | — | — | Extra wide oven, glass door 10s 9d extra | Cream with black hob or two-tone colours | £30 13 0 (leg) £32 5 0 (plinth) |
| One 8in solid 1,800 W "Simmerstat" control One 6½in solid 1 kW three-heat control | 10½×8in solid 2 kW grill boiler | 5×19×15 | — | — | Extra wide oven, glass door 10s 9d extra | Cream with black hob or two-tone colours | £33 7 0 (leg) £34 19 0 (plinth) |
| One 8in solid 1,800 W "Simmerstat" control One 6½in solid 1 kW three-heat control | 10½×8in solid 2 kW grill boiler | 5×19×15 | — | — | — | All cream or white | £34 19 0 £47 14 6 (with auto-timer and ringer and 8in radiant plate) |
| One 8in radiant 2·2 kW "Simmerstat" controlled One 6½in solid 1 kW | 10½×8 grill boiler 2 kW | 4½×17½×12½ | 7⅛×17×15½ | 400 W | Time clock, illuminated hob. Glass door £2 14s extra | Cream or white | £52 10 0 |
| One 8in solid 2 kW "Simmerstat" controlled One 6½in solid 1 kW three heat (model 305—8in plate only) | 10½×8 grill boiler 2 kW | 4⅜×11⅝×17 | 7×13½×17⅝ (unheated) | — | Glass door standard, storage drawer £1 18s extra, timer control £8 12s extra | Cream or white | £34 19 0 (310) £32 5 0 (305) |
| Two 8in radiant 2 kW each Two 6½in radiant 1 kW each all auto controlled | Separate grill 1,500 W | 5½×13½×14½ | 6¼×13½×16 | 400 W | Auto-time control, illuminated hob, drop-down oven door, grill warming drawer | Cream or white | £131 14 0 |

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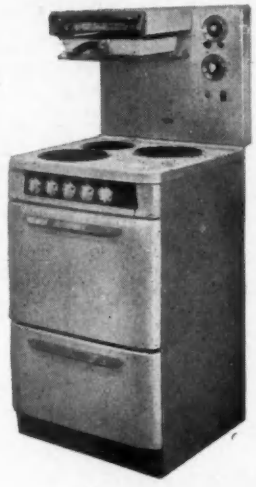
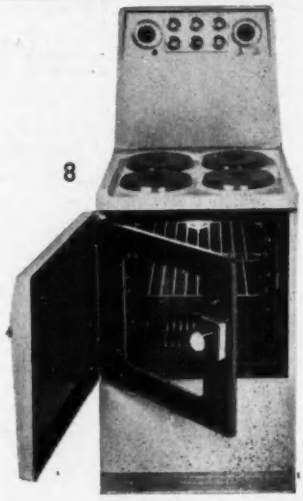


4. *English Electric model 2031 cooker showing interior oven light*
5. *Simplex Creda "Stargazer" cooker with timer control*
6. *Carron model L.75 cooker fitted with auto-timer and ringer*
7. *G.E.C. "Supreme" eye-level grill cooker*
8. *Simplex Creda "Mercury Four" 4-plate cooker*

8



| Manufacturer | Name or Model | Type | Size (H.W. & D. in inches) | Oven Type | Oven Size (H.W. & D. in inches) | Oven Loading | Type of Element | Oven Control |
|---|---|---|---|---|---|---|---|---|
| **CREDA (SIMPLEX ELECTRIC CO., LTD.), Creda Works, Blythe Bridge, Staffs.** *(continued)* | " Mercury " Standard and de-luxe | Vertical | 41¾ × 20 × 22⅝ | Fixed, removable sides | 15 × 14 × 15½ | 2,500 W | Tubular sheathed | Thermostatic |
| | " Mercury Four " | Vertical | 50 × 20 × 23½ | Fixed, removable sides | 15 × 14 × 15½ | 2,500 W | Tubular sheathed | Thermostatic |
| **ENGLISH ELECTRIC CO., LTD., Queens House, Kingsway, London, W.C.2.** | 2020 | Plinth, raised oven | 61 × 25½ × 26 (30in to top of hob) | Fixed, removable element guards | 14¾ × 14½ × 13½ | 2,500 W | Two banks of spirals and two rod type | Thermostatic, automatic oven timer |
| | 2030 | Plinth | 36 × 21 × 22⅝ | Fixed, removable element guards and base plate | 13⅜ × 13⅜ × 17½ | 2,600 W | Two tubular sheathed | Thermostatic |
| | 2031 | Plinth | 36 × 21 × 22⅝ | Fixed, removable element guards and base plate | 13⅜ × 13⅜ × 17½ | 2,600 W | Two tubular sheathed | Automatic oven timer and thermostat |
| **GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2.** | DC757GD " Quality " | Vertical plinth | 43¼ × 18⅝ × 21 | Removable (3-piece) | 13½ × 13⅜ × 14⅜ | 2,425 W | Sheathed wire | Thermostatic |
| | DC120 DC124 " Supreme " | Vertical plinth | 54 × 22 × 24 | Removable (3-piece) | 13½ × 16½ × 15½ | 3,395 W | Sheathed wire | Thermostatic |
| | DC115 " Superb " | Vertical plinth | 53 × 21 × 24½ | Removable (3-piece) | 13½ × 16½ × 15½ | 2,910 W | Sheathed wire | Thermostatic |
| **MOFFATS, LTD., 1, Newman Street, London, W.1.** | 40D100W | Horizontal | 49 × 40 × 28½ | Fixed, two ovens | 15½ × 21 × 20 and 15½ × 13½ × 20 | " Bakemaster " Top: 3 kW Bottom: 2·4 kW " Thrift " Top: 3 kW Bottom: 1·5 kW | Spiral and " Conrad " | Synchromatic |
| | 30D100W | Vertical | 49 × 30 × 28½ | Fixed | 15½ × 24 × 18½ | Top: 3·3 kW Bottom: 2·4 kW | Spiral and " Conrad " | Synchromatic |
| | 24D80WR | Vertical | 49 × 24 × 28½ | Fixed | 15½ × 21 × 20 | Top: 3 kW Bottom: 2·4 kW | Spiral and " Conrad " | Synchromatic |
| **RADIATION, LTD., (Electrical Division), 255, North Circular Rd., Neasden, N.W.10.** *(continued on next page)* | 69 " Giant " | Table | 16 × 18 × 18½ | Fixed | 8½ × 10 × 13½ | 1,100 W | Tubular sheathed (base) spirals (top) | Thermostatic |
| | 390J | Vertical, legs, plinth, drawer | 45 × 20½ × 22½ (36in to top of hob) | Removable element guards | 14½ × 13½ × 15⅝ | 2,500 W | Tubular sheathed | Thermostatic |
| | 391J | Vertical, legs, plinth, drawer | 45 × 20½ × 22½ (36in to top of hob) | Removable element guards | 14½ × 13½ × 15⅝ | 2,500 W | Tubular sheathed | Thermostatic |
| | 394J | Vertical, plinth, drawer | 45 × 20½ × 22½ (36in to top of hob) | Removable element guards | 14½ × 13½ × 15⅝ | 2,500 W | Tubular sheathed | Thermostatic |

| Hot Plates | Grill or Grill Boiler | Hot Cupboard or Grill Compartment (H.W. & D. in inches) | Storage Drawer (H.W. & D. in inches) | Storage Drawer Loading | Special Features | Finish | Price |
|---|---|---|---|---|---|---|---|
| Three 7¼in dia. Creda "Quick Discs" all auto controlled | Separate grill 2,250 W | — | 9½×17×18 | 400 W | Extra rapid boiling plate, easy to clean hob, large grill. (Glass door, timer and oven interior light on de-luxe model) | Cream or white | £35 14 0<br>£40 19 0<br>(de-luxe) |
| Four 7¼in dia. Creda "Quick Discs" all auto controlled | Separate grill 2,250 W | — | 9½×17×18 | 400 W | As above plus 4 boiling units high splashplate, auto-time control, and 5-hr ringer | Cream or white | £51 9 0 |
| Two 8in radiant 2·1 kW each and one 6½in radiant 1·25 kW "Simmerstat" controlled | 13×8in 2·5 kW grill in oven ("Simmerstat" controlled) | 6½×22×15⅝ (400 W) | 13¾×22×24 (storage cupboard) | — | Grill "booster" control for rapid oven pre-heating, auto-control oven and hot cupboard | Cream or white and with colour hob | £75 0 0 |
| One 8in radiant 2·1 kW and one 6½in radiant 1·25 kW both "Simmerstat" controlled | 10½×8in 2·5 kW grill boiler (three heat) | 4⅝×13½×15½ | 5⅛×17⅜×18 | — | Interior oven light, lipped hob. Hob light and glass oven door optional extras | Champagne or white | £40 19 0 |
| One 8in radiant 2·1 kW and one 6½in radiant 1·25 kW both "Simmerstat" controlled | 10½×8in 2·5 kW grill boiler (three heat) | 4⅝×13¼×15½ | 5⅛×17⅜×18 | — | Auto control panel with timer and 5-hr ringer, interior oven light, lipped hob, and glass oven door. Hob light extra | Champagne or white | £51 9 0 |
| One 8in solid 1·8 kW Simmer switch controlled One 6½in solid 1 kW three heat | 10½×8in grill boiler 2 kW | 6×11⅞×16⅜ | 6×12×20 | — | Auto-control panel £10 15 0 extra. Storage drawer. Full view glass door and storage drawer. Gliding grill | Honeysuckle or gleaming white | £37 13 0 |
| DC120: Two 8in "Superspeed" radiant 2,350 W Simmer controlled. One 6½in "Superspeed" radiant 1,300 W Simmer controlled. DC124: As above plus one 6½in "Superspeed" radiant 1,300 W Simmer controlled | 12⅜×8⅜in eye level grill 2 kW | — | 7½×16⅜×20½ | 485 W | Eye level grill, auto timer, large oven below hob | Honeysuckle or gleaming white. Switch panel in Dresden blue, guardsman red or olive green | £74 0 0<br>(DC120)<br>£79 0 0<br>(DC124) |
| Two 8in "Superspeed" radiant 2,350 W Simmer controlled | 13½×8 grill boiler 2,500 W | 6½×15½×14½ | 4⅞×16 1/16×18⅜ | 485 W | Full view drop down glass door, auto timer, gliding grill, eye level controls | Honeysuckle or gleaming white, cloud grey front panels | £65 0 0 |
| One "Thermo-Guard" 2·2 kW, one at 1·9 kW, three at 1·3 kW each | Top oven element for grilling | All ovens have "warm" position | Two: 9×21×20 and 9×13½×20 | — | "Hi-Lo-Matic" oven racks, built-in "Rotissomat," roast meter | Titanium white | £205 0 0 |
| One "Thermo-Guard" 2·2 kW, three at 1·3 kW | Top oven element for grilling | All ovens have "warm" position | 9×24×18⅜ | 500 W | "Hi-Lo-Matic" oven racks, "Rotissomat," roast meter | Titanium white | £152 0 0 |
| One "Thermo-Guard" 1·3 kW, one at 1·9 kW, two at 1·3 kW | Top oven element for grilling | All ovens have "warm" position | 9×21×20 | 500 W | "Hi-Lo-Matic" oven racks, roast meter | Titanium white | £135 0 0 |
| One 7in radiant "Simmerstat" controlled | Grill in top of oven 800 W | 10½×5½×13½ | — | — | Stand complete with potshelf £2 0 0 extra | Cream and black or white and black or eau-de-nil turquoise top | £19 10 0 |
| One 8in solid 2 kW "Speedring" (six heat) | 10½×8in grill boiler 2 kW | 4⅞×12½×17½ | 8⅜×17½×14⅛ (unheated) | — | "Cookalone" auto-control unit, radiant hotplate and "Simmerstat" extra | All cream or all white or with eau-de-nil or turquoise blue relief on splash plate, hob and plinth or drawer front | On application (legs)<br>£31 0 0 (plinth)<br>£33 0 0 (drawer) |
| One 8in solid "Speedring" 2 kW (six heat) One 6½in solid "Speedring" 1,350 W (six heat) | 10½×8in grill boiler 2 kW | 4⅞×12½×17½ | 8⅜×17½×14⅛ (unheated) | — | "Cookalone" auto-control unit, radiant hotplates and "Simmerstat" extra | All cream or all white or with eau-de-nil or turquoise blue relief on splash plate, hob and plinth or drawer front | On application (legs)<br>£33 0 0 (plinth)<br>£35 0 0 (drawer) |
| One 8in solid "Speedring" 2 kW (six heat) One 6½in solid "Speedring" 1,350 W (six heat) | 10½×8in 2 kW | 4⅞×12½×17½ | 8⅜×17½×14⅛ | 500 W | Glass oven door. "Cookalone" auto-control unit, radiant hotplates and "Simmerstat" extra | All cream or all white or with eau-de-nil or turquoise blue relief on splash plate, hob and plinth or drawer front | £35 10 0 (plinth)<br>£37 10 0 (cold drawer)<br>£40 10 0 (heated drawer) |

| Manufacturer | Name or Model | Type | Size (H.W. & D. in inches) | Oven Type | Oven Size (H.W. & D. in inches) | Oven Loading | Type of Element | Oven Control |
|---|---|---|---|---|---|---|---|---|
| **RADIATION, LTD.** (Electrical Division), 255, North Circular Road, Neasden, N.W.10. (*continued*) | 3951 | Vertical, eye-level grill, drawer | 45×20⅜×22½ (36in to top of hob) | Removable element guards | 14½×13⅜×15⅝ | 2,500 W | Tubular sheathed | Thermostatic |
| | 3961 | Vertical, eye-level grill, drawer | 45×20⅜×22½ (36in to top of hob) | Removable element guards | 14½×13⅜×15⅝ | 2,500 W | Tubular sheathed | Thermostatic |
| **REVO ELECTRIC CO., LTD.,** Tipton, Staffs. | "Revomatic" | Vertical, plinth | 53½×23×24 (36in to top of hob) | Removable | 14×15⅝×13⅝ | 2,100 W | Sheathed | Thermostatic |
| | "Regal" | Vertical, plinth | 48⅝×23×24 (36in to top of hob) | Removable | 14×15⅝×13⅝ | 2,100 W | Sheathed | Thermostatic |
| | "Regent" 553 | Vertical, plinth or utensil drawer | 45×21×21½ (36in to top of hob) | Removable | 13⅜×13⅜×14 | 2,100 W | Sheathed | Thermostatic |
| | "Peerless" Major | Table, or on stand or cabinet | 17⅜×21×15½ | Fixed | 12½×11⅝×13 | Grill: 2,000 W Bottom: 900 W | Spiral on ceramic former | Thermostatic |
| | "Revo-Luxe" | Vertical, utensil drawer | 53×21×23 (36in to top of hob) | Removable | 13⅜×14⅜×15 | 2,100 W | Tubular interchangeable | Thermostatic |
| **TRICITY COOKERS, LTD.,** 109, Kingsway, London, W.C.2. | "Popular" 528 | Vertical | 36×19¾×16 | Fixed | 10⅛×11½×12½ | 1,150 W | Coil former | Thermostatic |
| | "Viscount" 575 | Vertical | 50⅝×21×23½ (36in to top of hob) | Removable sides | 15⅝×15×15⅛ | 2,400 W | Plug-in tubular | Thermostatic |
| | "Marquis" 580 | Vertical | 53×21×24⅛ | Removable sides | 15⅝×15×15⅛ | 2,400 W | Plug-in tubular | Thermostatic |

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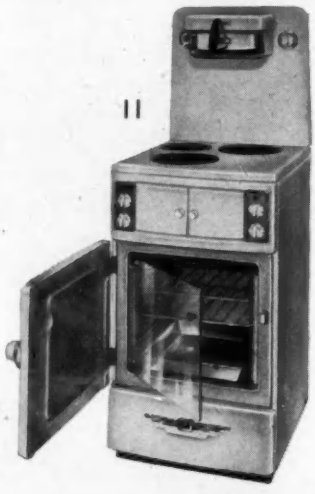

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| Hot Plates | Grill or Grill Boiler | Hot Cupboard or Grill Compartment (H.W. & D. in inches) | Storage Drawer (H.W. & D. in inches) | Storage Drawer Loading | Special Features | Finish | Price |
|---|---|---|---|---|---|---|---|
| One V.H.S. 2·5 kW with automatic cut-out<br>One 8in solid "Speedring" 2 kW (six heat)<br>One 6½in solid "Speedring" 1,350 W (six heat) | Eye-level grill 2 kW | 4⅞ × 12½ × 17½ | 8½ × 17½ × 14½ | 500 W | Eye-level grill, glass oven door, oven roof protector | All cream or all white | £49 0 0<br>(cold drawer)<br>£52 0 0<br>(heated drawer) |
| One V.H.S. 2·5 kW with automatic cut-out<br>One 8in solid "Speedring" 2 kW (six heat)<br>One 6½in solid "Speedring" 1,350 W (six heat) | Eye-level grill 2 kW | 4⅞ × 12½ × 17½ | 8½ × 17½ × 14½ | 500 W | Eye-level grill, glass oven door, "Cookalone" auto-control unit, oven roof protector, griddle plate | All cream or all white | £60 0 0 |
| One 8in solid and one 8in radiant 1·8 kW each, "Simmerstat" controlled | 16 × 8 grill boiler 3 kW | 5½ × 16¾ × 20 | 4 × 17⅛ × 16½ (unheated) | — | Choice of five separate coloured hobs | Standard body colours—white or cream. Standard hob colours—black, ancona two-tone ivory, Windsor grey. Option of 5 coloured hobs (extra) | £74 7 0 |
| Two 8in solid 1·8 kW each, one "Simmerstat" controlled, one three heat | 10½ × 8 grill boiler 2·2 kW | 5½ × 16¾ × 20 | 4 × 17⅛ × 16½ (unheated) optional extra | — | Choice of five separate coloured hobs; option of time control | | £39 0 0 |
| One 8in solid 1·8 kW "Simmerstat" controlled<br>One 6½in solid 1 kW three heat | 10½ × 8 grill boiler 2·2 kW | 5 × 13 × 19 | — | — | Utensil compartment, choice of coloured hobs; glass door and time control optional | | £34 18 0<br>(plinth)<br>£36 8 0<br>(utensil drawer) |
| One 6½in solid 1 kW "Simmerstat" controlled | 10 × 7 grill boiler 2 kW | 10¼ × 7 × 13 | — | — | Suitable for 13 A outlet. Radiant hotplate extra | Grey and white or grey and cream; option of coloured hobs | £20 18 6 |
| One 8in 1·8 kW<br>One 6½in 1 kW<br>(one "Simmerstat" controlled, one three-heat) | 10½ × 8 2·2 kW | 5⅜ × 16⅜ × 18 | 6 × 16¾ × 18 (unheated) | — | Choice of five colours for hob and control panel; option of time-control, glass splash plate | White or cream. Option of coloured hob and control panel | £45 3 0<br>£49 7 0<br>(with time-control) |
| One 6½in solid 1 kW three heat | 10½ × 8 grill boiler 2 kW | 4 × 11½ × 12½ | — | — | Selector switch enables cooker to be used off 13/15 A circuit | Ivory or white | £21 7 0<br>£24 11 6<br>(with cabinet) |
| One 6½in solid 1 kW, one 8in solid 1·8 kW, "Simmerstat" controlled | Grill boiler 2·25 kW | 7⅛ × 18 × 18½ | — | — | Large oven, inner glass oven door. Time switch £5 5 0 extra | Ivory or white with choice of coloured facia panels | £38 17 0 |
| One 8in radiant, one 6½in radiant | Grill boiler 2·25 kW | 7⅛ × 18 × 18½ | — | — | Large oven, auto time switch, hob floodlight, oven light, inner glass oven door | Ivory or white | £57 18 0 |

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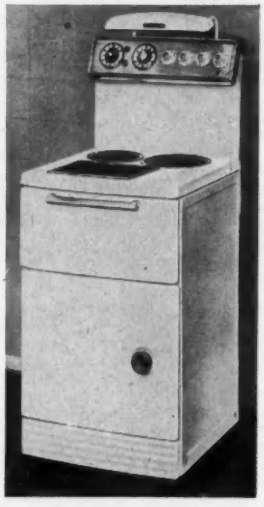
9. *G.E.C. "Superb" drop-down door cooker*
10. *"Revo Luxe" cooker with glass splash plate*
11. *Jackson 396J eye-level grill cooker (Electrical Division of Radiation, Ltd.)*
12. *Moffats model 40D100W luxury cooker*
13. *Tricity Cookers "Marquis"*



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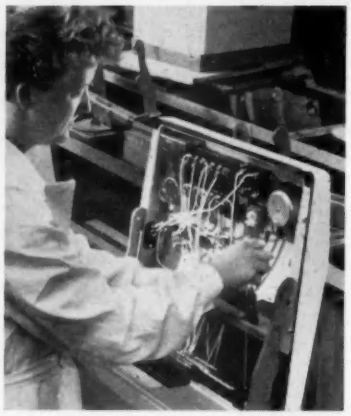
# COOKER SALES PROMOTION

*Simplex Creda Works at Blythe Bridge Visited*

AT the beginning of this year nine of the leading manufacturers of domestic electric cookers formed themselves into the Modern Cooking Promotional Committee with the object of engendering a better knowledge of the latest trends in electric cookers and cooking. Part of the Committee's campaign is to arrange visits to the works of some of its members and last week representatives of the electrical and allied Press were afforded the opportunity of touring the Creda works of the Simplex Electric Co., Ltd., at Blythe Bridge, Stoke-on-Trent.



*Assembly of a "Mercury Four" control panel*

Speaking at a luncheon which preceded the works tour, Mr. Claude Simmonds, of C.S. Services, Ltd. (which is handling publicity on the Committee's behalf) briefly described the aims of the Committee and also stressed the superiority of electric cooking over alternative methods. No other industry had moved or changed as rapidly during the past five years as the domestic electric cooker industry, said Mr. Simmonds, and improvement had followed improvement until the manufacturers could now present a cooker which cancelled out every criticism once levelled against electric cooking. Since 1955 the number of housewives cooking by electricity had increased by one million and the latest Board of Trade figures showed that in June this year 44,700 electric cookers were produced, compared with 26,200 in the same month last year—a rise of over 70 per cent.

Production facilities at the Creda works are in one large single-storey building which occupies an area of 500,000 sq ft. More than 3,000 electric cookers are produced each week at the plant and the number of employees is in the region of 2,000. Batch production methods are used to manufacture the cooker components which are fed to motorised assembly lines where the finished cooker is finally produced. Raw materials, such as sheet steel, ferrous and non-ferrous tube, bar and iron castings (the latter supplied from the company's own foundry in Birmingham) are received and stored adjacent to the press and machine shops. The press shop is equipped with guillotines with cutting capacities ranging from 3 to 8ft and power presses from 5 to 750 tons. Visitors were able to watch one of these heavy presses producing the warming drawers for the "Mercury" cookers. On leaving the presses these, and other formed components, are channelled to the welding section. The component parts, made from castings, bar and tube, are produced in the machine shop which is equipped with both light and heavy capstans, milling machines, grinding machines, and a battery of automatic lathes.

The semi-finished parts are temporarily housed in a work-in-progress store, whence they are withdrawn at a rate compatible with the production programme and passed to the appropriate finishing shop, dependent upon whether a plated, painted or vitreous enamel finish is required. The plating and painting processes were watched in the finishing departments. Paint is applied by compressed air spraying, aided by mechanical and automatic devices, which ensures an even coating of paint and consequently improves the resistance to corrosion of the finish. The paint is dried by passing the parts on

*Typicel views of electric cooker production at the Simplex Creda works. Left: One of the many heavy presses producing warming drawers for "Mercury" cookers. Centre: Oven interiors and hobs leaving the new automatic pickling plant. Right: Inspection of finished "Mercury Four" cookers before leaving assembly line for packing and dispatch*

conveyors through low- or high-temperature infra-red ovens, depending on the type of paint used. Epoxy resin paint, including a silicon additive, is employed for the cooker panels because this is proof against scratches and is unaffected by high temperatures.

A new fully mechanical spray cleaning and pickling plant was inspected in the vitreous enamelling department. This machine automatically degreases, washes off and dries all the sheet-metal components appropriate to the enamelling process. Also in this department are the drying ovens, a continuous electrically heated furnace (loading 625 kW) and four box muffle furnaces. These furnaces operate 24 hours a day, seven days a week.

Following the enamelling process the various parts are fed into the finished parts store where, together with such components as time control clocks, "Simmerstat" energy regulators, thermostats and other proprietary items delivered to the factory, they are eventually supplied to the main assembly lines. The most recent and up-to-date line is that on which the new "Mercury Four" is assembled. Part of the main assembly hall is allocated to the building of open spiral type elements, grills and grill boilers and other ancillary equipment. The embedded elements and boiling plates are made at the company's Oldbury factory. In order to ensure that a high standard of quality is maintained electrically, mechanically and in finish and performance, a large inspection staff is employed throughout the factory in the processing and assembly departments.

After the tour visitors were able to inspect the complete range of Creda cookers, as well as many other of the company's domestic products. While this inspection was taking place, it was pointed out by Mr. E. G. Plucknett (managing director, Simplex) that on a general average it takes about three years to develop an electric cooker, and the components may take even longer. The "Quick-Disc" cooker hotplates as used on the "Mercury" cookers took, in fact, 5½ years to develop. On the question of present-day prices, Mr. Plucknett said that although there had been no price slashes there had been a gradual easing of prices of existing models. Despite increased labour and material costs electric cooker manufacturers were giving the public far better value for money today than ever before. Whereas many luxury refinements such as automatic timer controls, ringers, glass doors, oven lights, etc., were previously available only at extra cost, the new models now included most of these as standard.

# THE DAIRY SHOW

THE use of electricity for grain crop drying was the main theme of the Electrical Development Association's exhibit at the 73rd annual Dairy Show organised by the British Dairy Farmers' Association and held at Olympia last week. Three methods of electrical drying in the barn were featured on the stand—batch drying in a tunnel, on a platform and storage drying. The first two methods are well known, but storage drying in the bale is comparatively new and is now finding favour among many farmers. With this method the bales are loaded initially two or three layers deep followed by similar loadings at intervals of two or three days until the barn is filled. Loose hay is then spread evenly from a loft platform to a depth of some 8ft, followed by similar loadings at two- to three-day intervals. The advantages claimed for this method are in the minimum handling, in that there is no need to move the dried grass until required for feeding purposes, and its low cost. Drying costs, it is shown, are less than £1 per ton.

An automatic humidity control, an interesting accessory to the "Typhoon" crop dryer, was also shown. This unit governs the amount of heat during the drying process according to the relative humidity, automatically switching the electric heater banks on or off without supervision, thus ensuring maximum efficiency for the drying plant. Samples of electrically dried hay from various parts of the country, which were available for inspection on the stand, proved to be of great interest to many visiting dairy farmers.

In the dairy section of the E.D.A. stand examples of electrically operated steam generating equipment were shown for *in situ* sterilising of recorder-releaser installations, together with electric water heaters specially designed for dairy farm use.

Several manufacturers exhibited refrigeration products including milk cooling plants, cold rooms, deep freeze equipment, etc. Purlac Equipment, Ltd., had on their stand a range of iced-water milk coolers for both surface and in-churn cooling, including models with capacities of up to 250 gallons per day. As in previous years, Prestcold exhibited a wide range of refrigeration equipment, while Gascoignes (Reading), Ltd., demonstrated their "Rotor-freeze" ice bank in-churn cooling system. Cold store door de-icing equipment and frost-heave protection equipment were to be seen on the stand of Loheat, Ltd.

Half a dozen or so companies exhibited delivery vehicles, including T. H. Lewis, Ltd.; Wales & Edwards, who had on view their "Rangemaster" fitted with colour impregnated fibre-glass bodywork; and Smiths Delivery Vehicles, Ltd. The last-named company's display included their latest one-ton model equipped with a heavy duty rear axle fitted with fully floating type half-shafts and hubs designed for single rear wheels. It is believed that this is the first time that an electric vehicle of this capacity has been fitted with a fully-floating axle. To the operator of electric milk delivery vehicles, batteries are of interest and the D.P. Battery Co., Ltd., took the opportunity of exhibiting a wide range of their products, including their new Kathanode "N" traction batteries. Specimens of "Tudor" Planté stationary cells for country house lighting and emergency lighting and power supply were exhibited.

Battery operated and mains electric fencers, together with a full range of electric fencing accessories were shown by Wolseley Engineering, Ltd. In addition to electric fencing the Cooper-Stewart Engineering Co., Ltd., exhibited electric calf de-horning equipment.

*The E.D.A. stand at the Dairy Show. The photograph shows visitors interested in the tunnel method of electric crop drying*

# NEW ELECTRICAL EQUIPMENT

## Fan Heater

The new "Desmo E.1" fan heater which is introduced by DESMO, LTD., Pensnett, Brierley Hill, Staffs., has two individually wired 1 kW elements so that both receive equal use on low heat, thereby ensuring longer life. It is fitted with two twin-level switches—one for the heaters and one for the fan—and its design is such that the fan comes into operation as soon as the appliance is plugged in. It can be used either as a free standing model or wall mounted, and a special ratchet fitting enables it to be adjusted to any angle. Apart from its use as a space heater, the unit can also be used for drying purposes. It is available in four different two-tone colour combinations and the price, including purchase tax, is £9 7s 6d.

*Desmo model "E.1" fan heater*

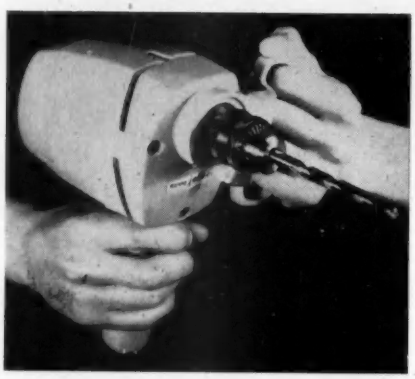
## Portable Power Tool

The REVO ELECTRIC CO., LTD., Groveland Road, Tipton, Staffs., have recently entered the portable power tool market with the introduction of the "Revo Jobber" electric drill, together with a full range of home workshop equipment.

The tool has a drilling capacity of $\frac{5}{32}$in (steel) or $\frac{1}{4}$in (hardwood) and the chuck speeds are 2,100 r.p.m. (fully loaded) and 3,300 r.p.m. (no load). The motor, rated at 350 W, is TV and radio suppressed and is controlled by a robustly constructed d.p. switch which can be locked in the "on" position. The casing of the drill is of diecast aluminium, finished in fawn/grey stoved enamel, and its design is such that it fits comfortably in the hand, thus giving minimum fatigue in operation. It has an overall length of 8in and the net weight is 4½ lb. Other features include a three-jawed geared chuck with hardened jaws, helical gears, air vents and 24 blade impeller and a built-in spirit level. The price, which includes a spanner, special handle, chuck key and 3 yd of cable, is £8 18s 6d.

In addition to the drill the company offers seventeen accessory packs. These include a lathe, drill stand, bench saw, bench sander and a baseboard.

*"Revo Jobber" electric drill*



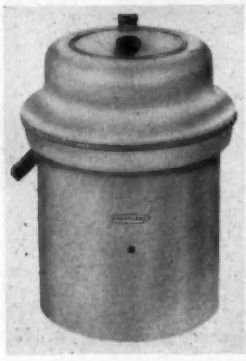
## Heating Cables

The Heating Cables Division of VOLEX ELECTRICAL PRODUCTS, LTD., Salford, 6, Lancs., has introduced a full range of "Voleata" heating cables for embedding in floors, walls and ceilings, together with specially modified types for horticultural use, roadways and sports grounds. The cable consists of a copper or copper alloy conductor, coated with a synthetic heat resisting enamel, embedded in a resilient rubber-like compound and sheathed with p.v.c. Special attention has been given to the design of the comprehensive range of terminations and installation fittings to ensure maximum convenience when installing. To assist in problems of application and installation the company offers a full technical service.

## Spin Dryer

The new "Spinette" spin dryer now being marketed by EASICLENE PORCELAIN ENAMEL (1938), LTD., Darlaston, Wednesbury, Staffs., has a capacity of 4½/5 lb dry weight of clothes and it is claimed that clothes can be spun dry within four minutes. A cylindrical machine, it has a hinged outer lid which, when raised, automatically switches off the motor and applies a brake to the rotating drum. Water is expelled from the machine through a slot around the inside of the drum through the drain outlet, which is situated high enough to accommodate a large bucket. The revolving drum is of anodised aluminium and the steel outer casing of the machine is finished in either white or cream stove enamel with red plastic trim. It measures 23¼in high by 16½in in diameter and the price is £20 5s 10d plus £3 14s 2d purchase tax.

*Easiclene "Spinette" spin dryer*



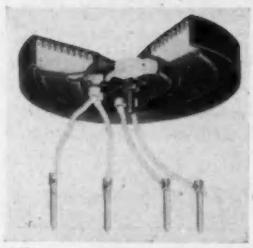
## Coffee Mill

The Italian "Piselli" electric coffee mill is now available in this country from INSLEY (LONDON), LTD., 21-22, Poland Street, London, W.1. Enough coffee for six to eight persons can be ground in the machine in fifteen seconds, claim the distributors, and by extending the milling period the fineness of the grind can be varied. High-duty alloy blades rotating at 24,000 r.p.m. are fitted and a tough transparent cover permits a clear view of the grinding operation. The loading of the machine is 110 W and it weighs approximately 2 lb. It is 6in high by 3¼in in diameter and its pressed metal body is finished in ivory, yellow or pastel blue and is mounted on rubber buffers. The price, including purchase tax, is £3 15s.

*"Piselli" coffee mill (Insley (London), Ltd.)*

## Cooker Hotplates

A recent announcement from the Electrical Division of RADIATION, LTD., 255, North Circular Road, Neasden, London, N.W.10, states that a further development of the Jackson "Speedring" cooker hotplates has now been introduced and will be incorporated in the company's 394, 395 and 396 electric cookers. Each of these cookers will have one 8in "V.H.S. (very high speed) Speedring" plate which incorporates a built-in safety device per-



*Cutaway view of the Jackson "V.H.S. Speedring" cooker hotplate*

mitting a much higher loading and consequent speed of boiling.

The basic design of the new plate is similar to the original "Speedring" and it can similarly be mounted on E.D.A. cradles for either six-heat control or stepless energy regulators. The loading has been increased to 2,500 W as compared with the 2,000 W of the original model. One of the advantages claimed by the manufacturers for the new thermal device of the "V.H.S. Speedring" is that it operates only on part of the loading of the plate and, therefore, contacts are never overloaded as they could be if the full load current of the plate was interrupted under conditions of high temperature.

## Portable Distribution Boards

As a contribution towards greater safety and convenience in temporary power distribution, LEXOR ELECTRONICS, LTD., Allesley Old Road, Coventry, have produced "Dis-Boards" which comprise a group of standard socket-outlets mounted in a portable steel case and connected by a flexible cable to a plug.

The steel cases are stove enamelled with a dark grey hammer finish and can be used on the floor, bench, etc., or hung on a wall. The extension cable is tough rubber sheathed and the sockets are interconnected with

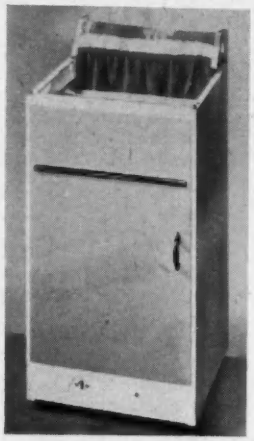
*Lexor Electronics 4-way 13 A "Dis-Board"*

p.v.c. sheathed wire. The whole unit is efficiently earth-bonded and a neon lamp is fitted to indicate when the unit is alive.

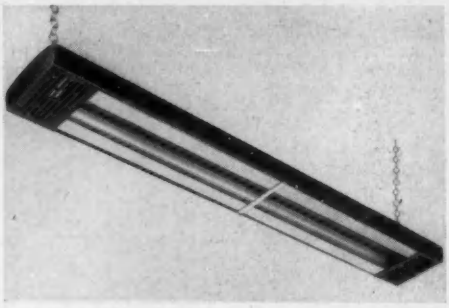
Standard arrangements comprise 2-, 4- or 6-way groups of either 5, 13 or 15 A sockets connected to either a 5, 13 or 15 A plug. Extension cable lengths are 9ft or 15ft or longer to order. Altogether, thirty standard combinations are available from stock and prices range from £3 7s 6d (2-way 13 A plug on 9ft cable) to £5 15s (6-way 15 A plug on 15ft cable).

## Clothes Dryer

The "Velvair" clothes drying and airing cabinet, now available in North West England from DORMAN & SMITH (DOMESTIC), LTD., Atherton Works, Blackwall Road, Preston, is an all-purpose appliance which can be used for drying crockery, warming plates and food, as well as serving as a convector heater. It can be loaded from either the top or front and the rods are in blocks of three. Of sheet steel construction, the cabinet is available in a range of colour combinations and is mounted on castors for easy movement. It has a foot operated switch, pilot light and cable storage arrangement. The price, including purchase tax, is £10 19s 6d.



*Left: "Velvair" clothes drying cabinet (Dorman & Smith (Domestic), Ltd.)*



*Above: G.E.C. 1½ kW "Twin-Zone" radiant heater*

## Radiant Heaters

The new "Twin-Zone" radiant heaters, a recent development by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, are designed to give either a concentrated or a widespread warmth. The heat intensity is varied by raising or lowering an aluminium reflector within the body of the heater. With the reflector in the narrow beam position, the heaters are suitable for providing warmth over isolated sections of buildings such as loading bays, hangars, garages, etc., while in the broad beam position they can be used for complete heating installations in churches, community centres and similar buildings. The frame of the heaters is constructed of sheet steel, finished in bronze stoved enamel, and the reflector is of aluminium. They are in two sizes, 1½ and 3 kW, and "Incoloy" sheathed wire elements are used. A wire guard to clip on to the underside of the heater is available as well as a top guard. Both models measure 44½in long by 6⅜in wide by 2¾in deep and have 40¾in fixing centres. They are priced at £7 10s and £9 2s 6d each, respectively.

# CATALOGUES AND LISTS

**ALTERNATORS.** — Leaflet describing vertical type high frequency motor alternator sets with outputs of 2·5 to 25 kVA, together with a pamphlet on transistorised control equipment for generating sets and a brochure on rotating rectifiers and "No-Break" sets.—**Vernons Industries, Ltd.,** Kirkby Industrial Estate, Liverpool.

**DOMESTIC APPLIANCES.**—32-page illustrated and priced catalogue (82) covering the range of "Swan Brand" electrical appliances and ground base aluminium holloware.—**Bulpitt & Sons, Ltd.,** St. George's Works, Icknield Street, Birmingham, 18.

Priced pamphlet describing the "Dreamland" electric blankets, together with an entry form for the maker's "Sweet Dreams" competition.—**Easipower Appliances, Ltd.,** 30, High Street, Southampton.

Illustrated catalogue (DAR/20) containing prices and particulars of the company's range of domestic appliances.—**Metway Electrical Industries, Ltd.,** Canning Street, Kemp Town, Brighton, 7.

Brochure dealing with the "Auto-Home" dry shaver for use on 12 V and 210-240 V supplies.—**Remington Rand, Ltd.,** 26-40, Kensington High Street, London, W.8.

**INSTRUMENTS.**—Illustrated catalogue describing precision electrical instruments.—**Muirhead & Co., Ltd.,** Beckenham, Kent.

Series of leaflets dealing with magnetic amplifiers, ferrite isolators, universal standing wave detector, wave meters and other instruments.—**W. H. Sanders (Electronics), Ltd.,** Gunnels Wood Road, Stevenage, Herts.

**REFRIGERATORS.**—Leaflet describing and illustrating the latest version of the "Coronet" 2 cu ft refrigerator.—**Lec Refrigeration, Ltd.,** Bognor Regis, Sussex.

**RELAYS.**—Leaflet describing the operation and applications of high accuracy current overload and underload relays.—**Elcontrol, Ltd.,** Wilbury Way, Hitchin, Herts.

**SWITCHES.**—Pamphlet illustrating and describing push-button control stations, limit switches, and float switches.—**Barries Electrical Agencies, Ltd.,** Canning Street, Kemp Town, Brighton, 7.

**WATER HEATERS.**—Descriptive leaflet on the Lido "Express" sink water heater fitted with special dispenser outlet control.—**Heatrae, Ltd.,** Heatrae Works, Norwich.

Leaflet giving particulars of the "Plow" instantaneous water heater.—**Plow Water Heaters, Ltd.,** 6, Newport Road, Cardiff.

**WELDING CONTROLS.**—Brochure covering a new range of resistance welding controls.—**Radiovisor Parent, Ltd.,** Stanhope Works, High Path, London, S.W.19.

**WIRING ACCESSORIES.**—85-page priced catalogue illustrated in colour and covering the "M.K." range of wiring accessories together with a separate numerical price list.—**M.K. Electric, Ltd.,** Shrubbery Road, Edmonton, London, N.9.

***Financial Section***

# STOCKS and SHARES

FURTHER advances in prices have reduced the average yield from the leaders in the industrial market of the Stock Exchange to no more than 4 per cent, and to a good deal less than that in the case of many of the most popular issues. One result of this has been to enhance by contrast the attraction of returns of up to 5 per cent or more offered by Government stocks, and to induce quite a substantial recovery in the gilt-edged market as a whole. Most of the British Electricity stocks, for instance, have appreciated by a full two points in a fortnight. Similarly, good class industrial debenture and other fixed-interest stocks have been in much better demand lately: the 6 per cent loan stock offered in August by G.E.C. now stands some 5 points above the issue price of 100. Another noticeable result of the contraction of yields from the "blue chip" class of industrials has been to instigate an active search for better returns among shares of the smaller firms.

## Rise in Share Prices

The extent of the rise in share prices during the tremendous surge of business in the past month, covering the General Election, is measured by the indices at about 15 per cent. Among electrical equipment and engineering shares, the gains of around 5s each in G.E.C. and English Electric were fairly close to that average. Heavy engineering shares were inclined to lag behind it, but in the sections associated with domestic equipment, radio and other consumer goods some of the performances were outstanding, as for instance the gains of almost £1 in Hoover and of 8s in Berry's Electric Magicoal. In proportion, the rises of more than 10s in Thorn Electrical and E.M.I., and of about 5s in Pye, Decca and E. K. Cole were similarly substantial. Motor accessory investments were also conspicuously favoured, as witness the advances of about 15s in Lucas and Chloride Electrical Storage, and the improvement in S. Smith & Sons.

## Crabtree Results

Other price movements which caught the eye during the great October advance in the industrial market included gains of 8s or more in Plessey (on which the final dividend is due to be declared this month), Brook Motors, International Computers and Ward & Goldstone. Elliott Automation put on 6s in the month. During the past week, one of the best features was the rise in Crabtree Electrical 10s shares, to 38s 9d, on the strength of the figures in the preliminary statement on the results for the twelve months to last July. Trading profits expanded by one third, and with little change in the tax provision, the net surplus comes out almost twice as large as before. The dividend remains at 20 per cent for the sixth year in succession, but now has practically threefold cover out of earnings; the yield on the shares is a fraction under 5¼ per cent.

## Crompton Parkinson

After some fluctuation at the time of the final dividend declaration, the 5s

## *Price Changes in*

| Company or Board | Nom. Value | Middle price 2nd Nov. | Week's Rise or Fall | Dividend Previous | Dividend Last | Yield % | 1959 Highest | 1959 Lowest |
|---|---|---|---|---|---|---|---|---|
| *Gilt-edged Stocks* | | | | | | £ s d | | |
| Brit. Elec. 1968/73 | 100 | 80½ | +½ | 3 | 3 | 3 14 6 | 80½ | 77½ |
| Brit. Elec. 1974/77 | 100 | 77½ | +1 | 3 | 3 | 3 17 6 | 77½ | 74½ |
| Brit. Elec. 1976/79 | 100 | 81 | +1 | 3½ | 3½ | 4 6 6 | 81 | 77½ |
| Brit. Elec. 1974/79 | 100 | 91½ | +1 | 4½ | 4½ | 4 12 9 | 91½ | 87½ |
| *Overseas Electric Supply* | | | | | | | | |
| Calcutta Elec. | £1 | 19/6 | | 6·8† | 7† | 11 15 0 | 19/6 | 16/- |
| East African Power | £1 | 20/- | | 7½ | 8 | 8 0 0 | 22/3 | 19/3 |
| Nigerian Elec. | £1 | 16/6 | +2/- | 8 | 8 | 9 14 0 | 16/6 | 13/- |
| Perak Hydro-Elec. | £1 | 15/- | | 12½ | 10 | 13 6 9 | 15/- | 12/3 |
| *Electrical Shares* | | | | | | | | |
| Aberdare Holdings | 5/- | 18/9 | | 17½ | 17½ | 4 13 3 | 18/9 | 15/6 |
| Aerialite | 1/- | 12/- | +1/6 | 51½ | 54 | 4 10 0 | 12/3 | 7/9 |
| Allen, W. H. | £1 | 53/3 | | 11 | 12 | 4 10 3 | 53/3 | 43/- |
| Allied Insulators | 5/- | 23/6 | | — | 20‡ | 4 5 0 | 23/6 | 18/9 |
| Anglo-Portuguese Tel. | £1 | 30/- | | 9 | 9 | 6 0 0 | 30/9 | 26/6 |
| Aron Elec. Ord. | £1 | 50/- | | 15 | 15 | 6 0 0 | 62/6 | 50/- |
| Assoc. Elec. Ord. | £1 | 66/3 | | 15 | 15 | 4 10 6 | 67/- | 53/9 |
| Automatic Tel. & El. | £1 | 80/- | +1/3 | 17 | 17‡ | 4 5 0 | 82/6 | 71/3 |
| Babcock & Wilcox | £1 | 46/3 | | 13‡ | 13 | 5 12 3 | 52/6 | 45/- |
| Bakelite | 10/- | 40/- | | 15 | 15 | 3 15 0 | 40/- | 22/- |
| Baldwin, H. J. | 2/- | 2/3 | +3d | 20 | — | — | 3/- | 2/- |
| Berry's Electric | 5/- | 28/9 | | 10 | 20‡ | 3 9 6 | 29/- | 7/3 |
| Bowthorpe Holdings | 2/- | 10/9 | | 25 | 27 | 3 0 6* | 10/9 | 8/- |
| British Elec. Traction: Def. Ord. "A" | 5/- | 47/6 | +6d | 25 | 35 | 3 13 9 | 47/6 | 35/6 |
| B.I. Callender's | £1 | 54/6 | −1/9 | 12½ | 13½ | 4 19 0 | 58/6 | 44/9 |
| B.I. Callender's 6% Pref. | £1 | 21/- | +6d | 6 | 6 | 5 14 3 | 21/- | 19/9 |
| British Thermostat | 5/- | 23/9 | | 30 | 35 | 3 13 9* | 28/- | 18/6 |
| British Vac. Cleaner | 5/- | 9/6 | +1/3 | 10 | 7½* | 3 19 0 | 9/6 | 4/6 |
| Brook Motors | 10/- | 59/6 | +9d | 25 | 24½* | 4 1 0 | 59/6 | 46/- |
| Bulgin, A. F. | 1/- | 11/6 | | 45 | 50 | 4 7 0 | 11/6 | 6/9 |
| Bulpitts | 5/- | 18/9 | | — | 15 | 4 0 0 | 18/9 | 10/- |
| Burco Dean | 5/- | 18/3 | | 22½ | 16* | 4 7 9 | 18/3 | 12/3 |
| Cable & Wireless: Ord. | 5/- | 18/3 | | 10 | 10* | 2 14 9 | 18/3 | 12/3 |
| 4% Loan | 100 | 94½ | | 4 | 4 | 4 4 9 | 95 | 93 |
| Chloride El. Storage "A" | £1 | 72/- | +2/- | 17½ | 20‡ | 3 14 0* | 72/- | 43/8 |
| Clarke Chapman | £1 | 57/6 | | 27½ | 13¾* | 4 15 9 | 66/3 | 52/6 |
| Cole, E. K. | 5/- | 25/- | +6d | 17½ | 20 | 4 0 0 | 25/- | 17/3 |
| Contactor Switchgear | 5/- | 14/6x.d. | −1/9 | 14 | 14 | 4 16 6 | 16/9 | 12/- |
| Cossor, A. C. | 5/- | 7/6 | | Nil | 5 | 3 6 9 | 9/- | 6/3 |
| Crabtree | 10/- | 38/9 | +4/9 | 20 | 20 | 5 3 3 | 40/- | 28/- |
| Crompton Parkinson | 5/- | 19/- | +1/9 | 12 | 14 | 3 13 9 | 19/- | 11/9 |
| Davis & Timmins | 5/- | 20/- | +1/- | 18 | 20 | 5 0 0 | 20/- | 14/6 |
| De La Rue | 10/- | 64/- | +4/- | 17½ | 20 | 3 2 6 | 64/- | 30/3 |
| Decca "A" | 10/- | 44/3 | +3d | 43½ | 50 | 4 10 6* | 44/3 | 33/3 |
| Desoutter | 5/- | 31/- | +1/- | 32½ | 21¾* | 3 10 3 | 31/- | 19/- |
| Dewhurst | 2/- | 8/9 | | 20 | 20 | 4 11 6 | 8/9 | 7/3 |
| Dictograph Tel. | 2/- | 9/3 | +3d | 20 | 20 | 4 6 6 | 9/3 | 7/- |
| Dubilier Condenser | 1/- | 5/6 | +6d | 20 | 25 | 4 11 0 | 5/6 | 3/3 |
| Duport | 5/- | 18/- | +1/6 | 25 | 12½* | 3 9 6 | 18/- | 10/3 |
| E.M.I. | 10/- | 62/6 | +4/6 | 15 | 20* | 3 4 0 | 64/6 | 48/- |
| Electrical Apparatus | 5/- | 15/-x.d. | −3d | 14½ | 14½ | 4 16 9 | 16/6 | 13/- |
| Electrical Components | 5/- | 12/6 | +9d | 12½ | 15 | 4 0 0* | 12/6 | 7/- |
| Elec. Construction | £1 | 37/- | +6d | 8½ | 9 | 4 17 3 | 37/- | 27/9 |
| Elliott-Automation | 5/- | 29/- | +1/6 | — | 10‡ | 1 14 6 | 30/6 | 16/9 |
| English Electric | £1 | 48/- | −3d | 14 | 14 | 3 17 9* | 48/9 | 37/10 |
| English Electric 3½% Pref. | £1 | 13/- | | 3½ | 3½ | 5 15 6 | 12/9 | 12/3 |
| Ericsson Tel. | 5/- | 24/- | | 12† | 13† | 4 8 6 | 27/3 | 22/3 |
| Ever Ready | 5/- | 27/6 | | 20 | 27½‡ | 3 0 0* | 28/- | 13/3 |
| Falk Stadelmann | £1 | 33/9 | +3/9 | 10 | 10 | 5 18 6 | 33/9 | 25/- |

The above quotations are based upon middle prices in the Stock Exchange Daily Official List.
* After scrip issue. † Free of income tax. ‡ Dividend indicated.

shares of Crompton Parkinson showed a gain of about 1s 9d over the week, at 19s. With the dividend raised from a total of 12 to 14 per cent, the yield improves to 3·7 per cent. A 25 per cent scrip issue is proposed, and shareholders are advised not to take this as implying any further change in the amount to be distributed in dividends. There was favourable comment on the company's achievement in expanding the net group profit by more than £100,000, to £1¼ million, in the circumstances prevailing during the twelve months ended last June. On the basis of the figures in the preliminary statement, the new rate of dividend is covered 2½ times over by the distributable surplus of profits.

## Electrical Investments

| Company or Board | Nom. Value | Middle price 2nd Nov. | Week's Rise or Fall | Dividend Previous | Dividend Last | Yield % £ s d | 1959 Highest | 1959 Lowest |
|---|---|---|---|---|---|---|---|---|
| *Electrical Shares—continued* | | | | | | | | |
| G.E.C. | £1 | 44/- | −1/6 | 10 | 10 | 4 11 0 | 48/- | 31/3 |
| G.E.C. 6½% Pref. | £1 | 22/6 | +6d | 6½ | 6½ | 5 15 6 | 22/6 | 20/3 |
| General Cables | 5/- | 7/9 | | 24 | 15 | 9 13 6 | 9/3 | 7/6 |
| Greenwood & Batley | £1 | 110/- | +2/- | 20 | 30 | 5 9 0 | 110/- | 75/- |
| Hackbridge Holdings | 5/- | 17/3 | −1/6 | 20 | 20 | 5 16 0 | 19/3 | 14/3 |
| Hackbridge & Hewittic | 5/- | 15/6 | +6d | 20 | 20 | 4 16 9 | 15/6 | 10/6 |
| Head Wrightson | 5/- | 36/9 | +3d | 17½ | 20* | 2 14 6 | 38/- | 24/3 |
| Heatrae | 2/- | 10/- | | 20 | 20 | 4 0 0 | 10/- | 7/6 |
| Holophane | 5/- | 20/- | +1/3 | 22½ | 26 | 6 10 0 | 20/- | 14/9 |
| Hoover | 5/- | 98/9 | +4/9 | 50 | 60 | 3 0 9 | 98/9 | 55/- |
| I.C.I. | £1 | 55/6 | +1/- | 12 | 8* | 2 17 9 | 55/6 | 33/- |
| Intl. Combustion | 5/- | 37/6 | −9d* | 25 | 30‡ | 4 0 0 | 38/6 | 29/9 |
| Intl. Computers & T. | £1 | 72/6 | +6d | — | 8‡ | 2 4 0 | 78/9 | 57/6 |
| Johnson & Phillips | £1 | 21/- | −9d | 5 | 5 | 4 15 3 | 30/6 | 20/- |
| Lancashire Dynamo | £1 | 48/9 | +1/3 | 11 | 12½‡ | 3 16 9* | 48/9 | 31/6 |
| Laurence Scott | 5/- | 18/9 | +6d | 15 | 15 | 3 9 0* | 18/9 | 14/- |
| Lister, R. A. | £1 | 50/6 | +1/9 | 10 | 12½ | 4 19 0 | 50/6 | 32/9 |
| Lucas, J. | £1 | 70/- | +3/9 | 7½ | 10‡ | 2 17 3 | 70/- | 43/3 |
| Marconi Marine | £1 | 42/- | | 10 | 10 | 4 15 3 | 48/6 | 40/- |
| Marryat & Scott | 2/- | 11/- | | 37½ | 22½* | 4 1 9 | 11/- | 8/6 |
| Mather & Platt | £1 | 49/- | −1/- | 15 | 10‡* | 4 6 6 | 51/6 | 41/3 |
| Metal Industries | £1 | 65/- | +2/6 | 14 | 14 | 4 6 3 | 65/- | 39/9 |
| Midland Elec. Mfg. | £1 | 48/9 | | 12½ | 10* | 4 2 0 | 48/9 | 41/6 |
| Morphy-Richards | 4/- | 30/-x.d. | −6d | 20 | 25 | 3 6 9 | 34/- | 18/- |
| Murex | £1 | 58/9 | +2/3 | 17½ | 15 | 5 2 3 | 58/9 | 42/- |
| Newman Ind. | 2/- | 3/3 | | 10 | 10 | 6 3 0 | 3/6 | 2/3 |
| Oldham & Son | 1/- | 3/- | | 17½ | 17½ | 5 16 9 | 3/3 | 2/6 |
| Parsons, C. A. | £1 | 52/6 | | 7½ | 8½‡ | 3 1 9 | 58/- | 45/9 |
| Philips' Lamps | Fl.10 | 124/- | +1/6 | 14 | 14 | 2 2 9 | 130/- | 88/- |
| Plessey | 10/- | 43/6 | +2/- | 30 | 14*‡ | 3 4 3 | 44/6 | 23/6 |
| Pye | 5/- | 20/3 | +9d | 12½ | 12½ | 3 1 9 | 20/3 | 13/9 |
| Pyrotenax | 5/- | 47/- | +2/6 | — | 34 | 3 12 6 | 47/- | 33/9 |
| Reliance Clifton | 5/- | 23/6x.d. | −6d | 15 | 15 | 3 3 9 | 24/6 | 17/6 |
| Reyrolle | £1 | 91/6 | −1/- | 17½ | 17½ | 3 16 6 | 98/- | 85/9 |
| Rheostatic | 4/- | 12/- | +9d | 12½ | 12½ | 4 3 3 | 12/- | 8/3 |
| Richardsons Westgarth | 10/- | 12/3 | | 8½ | 8½ | 6 16 0 | 15/3 | 11/6 |
| Simon-Carves | 5/- | 31/3 | | 25 | 25 | 4 0 0 | 32/- | 28/6 |
| Smith (England), S. | 4/- | 21/- | | 20 | 12½*‡ | 2 7 6 | 21/- | 11/6 |
| Southern Areas | £1 | 14/6 | +3d | Nil | Nil | Nil | 15/- | 10/6 |
| Strand Elec. | 5/- | 18/- | +1/6 | 15 | 20 | 5 11 0 | 18/- | 8/6 |
| Sturtevant | 5/- | 23/6 | +6d | 15† | 15† | 5 5 9 | 23/6 | 17/- |
| Sun Elec. | 5/- | 16/3 | | 25 | 25 | 3 17 0* | 16/9 | 8/3 |
| Switchgear & Cowans | 5/- | 16/- | +1/- | 22½ | 15* | 4 13 9 | 16/- | 10/3 |
| T.C.C. | 10/- | 55/- | +2/6 | 25 | 25 | 4 11 0 | 55/- | 38/- |
| Telephone Mfg. | 5/- | 7/- | | 10 | 10 | 7 2 9 | 7/3 | 4/9 |
| Telephone Rentals | 5/- | 17/6 | −6d | 12½ | 12½* | 4 0 9 | 18/- | 11/9 |
| Thompson (John) | 5/- | 20/- | −1/3 | 25 | 25 | 6 5 0 | 25/6 | 20/- |
| Thorn Elec. | 5/- | 48/9 | +3/3 | 17½ | 20 | 2 1 0 | 48/9 | 26/3 |
| Thornycroft | £1 | 25/9 | −6d | 7½ | 6 | 4 13 3 | 30/- | 20/6 |
| Tube Investments | £1 | 116/3 | +7/6 | 17½ | 20 | 3 8 9 | 120/- | 71/6 |
| Vactric | 5/- | 46/- | +2/- | 25 | 37½ | 4 1 6 | 46/6 | 26/3 |
| Veritys | 5/- | 1/6 | | 12½ | 2½ | — | 5/- | 1/3 |
| Walsall Conduits | 4/- | 15/3 | +1/3 | 22½ | 22½ | 3 7 0* | 15/3 | 10/8 |
| Ward & Goldstone | 5/- | 56/- | | 25 | 30 | 2 13 6 | 56/- | 30/6 |
| Watford | 2/- | 14/6 | −3d | 25 | 25* | 3 9 0 | 14/9 | 7/6 |
| Westinghouse | £1 | 52/6 | | 10 | 10 | 3 16 3 | 53/9 | 39/6 |
| West, Allen | 5/- | 14/3 | +6d | 12½ | 11½* | 4 2 0 | 14/3 | 11/9 |
| Wolf Electric | 5/- | 9/9 | | 10 | 10 | 5 2 6 | 9/9 | 7/9 |

### Electrical Components Issues

The capital of Electrical Components (Holdings) has been increased to £912,000 as a result of two issues now in progress. One of these is a 50 per cent scrip distribution by way of capitalisation of reserves, and the other a "rights" issue of new 5s shares at 7s 6d. The latter have been quoted at a premium of about 5s, with the issue price payable in full on 11th November, and can at present be bought free of transfer stamp duty. For the year ended last March the company returned increased earnings and raised the dividend from 12½ to 15 per cent. Further satisfactory progress in the first months of this year was reported in the statement accompanying details of the new issues. Maintenance of dividends at the equivalent of the present rate would give 10 per cent on the present capital, and a yield of 4 per cent on the new shares at an all-in price of 12s 6d.

### T.I. Dividend

Tube Investments £1 shares were marked up initially to nearly £6 after the announcement of the results for 1958–59, and later eased to 116s 3d. This represented a net rise of 7s 6d on the week, and of more than £1 in a month. The final dividend brings the total to 20 per cent, as compared with last year's 17½ per cent, which was also the rate forecast at the time of the company's acquisition of British Aluminium in the early part of this year. It is payable on capital increased by the two million shares issued in that connection. With the inclusion of seven months' earnings of British Aluminium in the present accounts, the figures show a rise of some £680,000 in trading profits, to nearly £6½ million, and threefold cover for the amount to be distributed as ordinary dividend. The yield becomes nearly 3½ per cent.

### Company News

Falk Stadelmann's results for the twelve months ended last March show a substantial recovery of the previous year's recession, the net profit being £64,000 higher at £200,000, despite heavier provisions for tax and depreciation. Dividends are brought up to 10 per cent, as forecast at the time of scrip and cash issues earlier in the year, and have twofold cover out of earnings. In the year now running, trading is stated to have remained buoyant, although profit margins are still under pressure. After rising from 30s to 33s 9d, the shares yield nearly 6 per cent. Laurence, Scott have initiated the payment of interim dividends with a payment of 5 per cent on account of the current year. The last annual dividend was 15 per cent, followed by a one-for-six scrip issue.

# REPORTS and DIVIDENDS

**Falk, Stadelmann & Co., Ltd.**—The accounts for the year ended 31st March last show a trading profit of £621,294, as compared with £510,368 for the preceding year, and after meeting all charges, including £181,662 for taxation, the net balance is £199,814 (against £135,238), of which £87,780 is retained in the accounts of subsidiary companies. After deducting £10,240 applicable to minority interests, the amount available to the parent company is £101,794. It is proposed to pay a final ordinary dividend of 5 per cent on capital increased by scrip and rights issues, making 10 per cent for the year (same equivalent). Shares issued for cash rank for 2½ per cent of the 5 per cent interim dividend. The staff pension and benevolent fund receives £18,000 and the balance carried forward is £84,905 (against £97,014 brought in).

In his review of the year, Mr. H. Falk (chairman and managing director) says, in referring to electric floor warming, that they have developed their own application of this principle. Their associate company, Wandleside Warren Wire Co., Ltd., has suffered unavoidable delays in commencing production, but this has now started. The company is unlikely to make a material contribution to profits during the current year. Each section of the group, with the exception of two relatively small units, has maintained or improved its position and traded satisfactorily.

Dealing with the activities of the parent company, Mr. Falk says that the lighting sections completed many important projects. The new range of "Truncolite" fluorescent assemblies is proving very successful. The domestic appliance section has made considerable headway, the "Supersil" free standing infra-red fire being one of the most outstanding electric heaters introduced this season. Further headway in the reorganisation of the electrical wiring accessories factory is enabling them to market these products with increasing success. No contribution to the group profit has yet been made by this factory, but Mr. Falk says he is confident that this will be remedied during the current year.

The cable factories have been fully employed during the year. Some rationalisation of productive capacity has taken place within the industry and, although competition has become even keener in the current year, they feel that trading conditions must become more normal in due course. During the current year export sales in the cable group have considerably expanded. The two lighting fittings factories have again both traded successfully, and many important contracts have been carried out. The high voltage switchgear factory again had a successful year, and continued its policy of developing new designs. Among these a new switch for 275 kV overhead lines was introduced.

The Australian and New Zealand branches improved their turnover. The reorganisation of the South African subsidiary involved considerable expense, and although this company is not yet trading profitably, it is being built on sound lines. The factory has again shown a modest trading profit, which has continued in the first half of the current year.

During the current year, group trading remains buoyant in all sections, although pressure is still being exerted on profit margins, especially those of the cable interests. The parent company has again achieved a satisfactory increase in turnover, and good progress is being maintained.

**Tube Investments, Ltd.**, in a preliminary announcement, reports group trading profits for the year ended 31st July last of £16,782,643, as compared with £16,104,804 for the previous year. After meeting all charges, including £6,152,202 for taxation, the net profit is £6,458,460 (against £6,003,420). These figures include the trading profits and other income of the aluminium companies for the seven months to 31st July, and dividends and interest received from those companies in respect of the period to 31st December, 1958. It is proposed to pay a final dividend of 12½ per cent (against 10 per cent), making 20 per cent (17½ per cent) for the year, leaving £4,227,201 for reserves and carry-forward.

**Crompton Parkinson, Ltd.**—The preliminary financial statement for the year ended 30th June last shows a consolidated net income of the group of £2,755,691, as compared with £2,687,577 for 1957-58, and after providing £1,442,096 for taxation and transferring £60,574 to specific reserves, the consolidated net balance is £1,253,021 (against £1,112,429), of which £1,164,981 is dealt with in the accounts of the parent company. It is proposed to pay a final ordinary dividend of 9 per cent (against 7 per cent), making 14 per cent for the year (12 per cent), and it is also proposed to capitalise £1,451,506 in a one-for-four scrip issue. It is stated that the scrip issue does not imply any further change in the total amount to be distributed by way of ordinary dividends. After payment of £15,000 to the trustees of the central benevolent fund and adding £106,199 taxation and other provisions no longer required, the balance transferred to revenue reserve is £732,391.

**The British Electric Transformer Co., Ltd.**, reports a net profit for the year ended 30th June last of £88,787, as compared with £83,849 for the preceding year. It is proposed to pay a dividend of 4s 3d per share on the 5s ordinary shares (unchanged), and a special dividend of 5d per share, free of income tax, on these shares, out of taxation provision no longer required. An interim dividend of 1¼ per cent is also declared on the preference shares for the three months to 30th September last, payable at the same time as the 3¾ per cent for the nine months ended 30th June last.

**Automatic Telephone & Electric Co., Ltd.**—The special voting rights attaching to the "A" deferred stock have been in existence since 1925 and have given to the holders 50 per cent of the total votes exercisable at general meetings of the company irrespective of the amount of ordinary stock in issue at any time. Since 1925 the ordinary capital has been increased from £360,000 to its present level of £3,440,000 without any corresponding increase in the deferred capital, with the result that the voting rights attaching to the ordinary stock units have decreased substantially. Discussions have taken place between A.T.E. and British Insulated Callender's Cables, Ltd. (who through a predecessor company acquired the whole of the £100,000 "A" deferred stock in 1935), and as a result a scheme has been prepared for the elimination of the special voting rights attached to the "A" deferred stock and the simultaneous conversion of both classes of deferred stock into ordinary stock which, if approved, will vest all voting rights in the ordinary stock.

**John I. Thornycroft & Co., Ltd.**, report a trading loss for the year to 31st July last of £56,347, as compared with a profit for the preceding year of £411,957. Taxation requires £8,867 and the consolidated loss is £65,214 (against a profit of £208,901). A sum of £588,574 is brought in, and £550,000 is taken from reserves. The proposed ordinary dividend for the year is 6 per cent (against 8½ per cent, including a special capital profits distribution of 1 per cent), and the balance carried forward is £1,038,579.

**Crabtree Electrical Industries, Ltd.**—The group net profit for the year to 31st July last amounts to £222,752, as compared with £112,572 for the preceding year, after meeting all charges, including £169,685 for taxation. The company received tax-free dividends from the subsidiaries amounting to £255,000. The dividend for the year is maintained at 20 per cent by a final payment of 12½ per cent.

**The British Electric Resistance Co., Ltd.**—After providing £28,200 for estimated taxation, the net profit for the year ended 31st July last is £29,273, as compared with £25,006 for 1957-58. General reserve receives £15,000, and it is proposed to pay a final dividend of 10 per cent, making 15 per cent for the year (against the equivalent of 13¾ per cent after allowing for a scrip issue). The balance carried forward is £10,753 (against £10,688 brought in).

[*Continued on page 627*

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## FINANCIAL SECTION (*continued*)

**Laurence, Scott & Electromotors, Ltd.,** are paying an interim dividend of 5 per cent on increased capital. No interim dividend was paid in the previous year, but the total for the year was 15 per cent.

**Simms Motor & Electronics Corporation, Ltd.,** has announced an interim dividend of 5 per cent (unchanged).

**The Pulsometer Engineering Co., Ltd.,** has declared an interim dividend of 7½ per cent (unchanged) on capital increased by other than scrip issues.

**Bulpitts (Swan Brand), Ltd.,** has announced an interim dividend of 5 per cent (unchanged).

**The Anglo-Portuguese Telephone Co., Ltd.,** has declared an interim dividend of 3 per cent, tax free (unchanged).

**The Pressed Steel Co., Ltd.,** is paying an interim dividend of 9 per cent (against 7½ per cent).

### Bankruptcies

**G. S. Burchill** and **R. F. Morgan,** carrying on business in co-partnership as Burchill & Morgan, electrical engineers, from 54, Wells Road, Bristol.—Receiving order made 20th October on debtors' own petition. Public examination 5th February at the Old Council House, Corn Street, Bristol, 1.

**H. F. Griffiths,** electrical engineer, formerly carrying on business at Central Chambers, Walsall Street, Bilston, Staffs.—Application for discharge to be heard on 27th November at the County Court, 50, Queen Street, Wolverhampton.

**A. E. Scott-Smith,** Linden Lea, Brooklands Road, Brooklands, Ches., electrical factor.—Last day for receiving proofs for dividend 10th November. Trustee, Mr. W. H. Meredith, 20, Byrom Street, Manchester, 3, Official Receiver.

**E. Bowes,** 3, Front Street, Langley Park, Durham, radio and electrical engineer.—Second and final dividend of 3s 0½d in the £, payable on and after 11th November at the office of F. P. Hunnam, 30-32, Grey Street, Newcastle-upon-Tyne, 1.

# NEXT WEEK'S EVENTS

*Organisers of electrical functions are advised to make use of the "Electrical Review" clearing house, Room 221, Dorset House, Stamford Street, London, S.E.1, to ascertain that proposed dates for their functions do not clash with others already arranged*

### MONDAY, 9th NOVEMBER

**Arborfield.**—R.E.M.E. Assembly Hall, 7 p.m. I.E.E. London Graduate and Student Section. Film evening.

**Bath.**—City Technical College, 6 p.m. I.E.E. Western Utilisation Group. "The Deltic Locomotive," by C. M. Cock.

**Birmingham.**—College of Technology, Gosta Green, 6 p.m. I.E.E. South Midland Supply and Utilisation Group. "Research on the Performance of High-Voltage Insulators in Polluted Atmospheres," by Dr. J. S. Forrest, P. J. Lambeth, and D. F. Oakeshott.

**Bolton.**—A.S.E.E. Bolton Branch. Visit to Cooks Nuttall, Ltd., Paper Mills, Horwich.

**Bournemouth.**—Grand Hotel, Firvale Road, 8 p.m. A.S.E.E. Bournemouth and District Branch. "The Development of Motor Control Centres."

**Bristol.**—Electricity House, 6 p.m. I.E.E. Western Centre. "Subscriber Trunk Dialling," by D. A. Barron.

**Henlow.**—R.A.F. Technical College, 8 p.m. I.E.E. London Graduate and Student Section, District meeting. "Silicon Transistors—Their Manufacture and Fields of Application," by J. T. Kendall.

**Ipswich.**—Electric House, 6.30 p.m. I.E.E. East Anglian Sub-Centre. "The Influence of Consumers' Load/Consumption Characteristics on Metering Practice," by L. B. S. Golds.

**Liverpool.**—Bluecoat Chambers, School Lane, 3 p.m. I.E.E. Mersey and North Wales Centre. "The Provision of Adequate Electrical Installations in Buildings"—(a) "Multi-Storey Flats and Maisonnettes," by C. A. Belcher; (b) "Houses," by C. Hyams; (c) "Commercial Buildings," by E. E. Jacobi; (d) "Small Industrial Premises," by J. A. Sharp. (Discussion at 6 p.m.)

**London.**—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Electronics and Communications Section. "Theory of the Travelling-Wave Parametric Amplifier," by Professor A. L. Cullen; "The Gain of Travelling-Wave Ferromagnetic Amplifiers," by Dr. P. J. B. Clarricoats; "Some Properties of Travelling-Wave Resonance," by J. R. G. Twisleton; and "Saturation Effects in a Travelling-Wave Parametric Amplifier," by A. Jurkus and P. N. Robson.

Grocers' Hall, Princes Street, E.C.2, 7 for 7.30 p.m. Old Centralians. Annual dinner.

White Hall Hotel, Bloomsbury Square, W.C.1, 7.15 p.m. A.S.E.E. Central London Branch. "The Duties of an M.P. Inside and Outside Parliament," by R. Ledger.

**Newcastle-on-Tyne.**—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North Eastern Centre. "Electrical Supplies to Power Station Auxiliaries," by D. A. Dewison.

**Sheffield.**—Livesey Clegg House, 44, Union Street, 7.30 p.m. Junior Institution of Engineers, Sheffield Section. President's address, "Electricity Supplies to Large Electric Arc Furnaces," by A. Haddock.

**Wembley.**—Century Hotel, 8.15 p.m. A.S.E.E. North West London Branch. "Nuclear Power Stations," by Dr. L. E. C. Hughes.

### TUESDAY, 10th NOVEMBER

**Belfast.**—Queen's University, Stranmillis Road, 6.30 p.m. I.E.E. Northern Ireland Centre. "The Provision of Adequate Electrical Installations in Buildings," by C. C. Hyams.

**Cardiff.**—Park Hotel. I.E.S. Cardiff Centre. Jubilee ball.

Angel Hotel, 7.30 p.m. A.S.E.E. South Wales Branch. Film of the 1959 Electrical Engineers (A.S.E.E.) Exhibition, presented by P. A. Thorogood.

**Chester.**—Westminster Hotel, City Road, 7.45 p.m. A.S.E.E. Chester and District Branch. "H.R.C. Fuses," by E. Jacks.

**Leeds.**—Great Northern Hotel, Wellington Street, 7 p.m. I.E.E. North Midland Graduate and Student Section. Students' lecture. "Something for Nothing? Heat Pump Achievements."

**Liverpool.**—University Club, 2, Mount Pleasant, 7 p.m. British Institution of Radio Engineers, Merseyside Section. "The Use of Transistors in Communication and Control," by E. Wolfendale.

**London.**—Café Royal, 7 for 7.30 p.m. I.E.E. Measurement and Control Section. Section dinner.

Connaught Rooms, W.C.2, 12.30 for 1 p.m. Electrical Industries Club luncheon.

At the Federation of British Industries, Tothill Street, S.W.1, 6 p.m. Illuminating Engineering Society. "Research in Phosphors," by A. H. McKeag.

**Maidstone.**—Royal Star Hotel, 7.30 p.m. A.S.E.E. West Kent Branch. "Electricity Distribution in Kent," by H. F. Knell.

**Manchester.**—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North Western Utilisation Group. "The Provision of Adequate Electrical Installations in Buildings: (a) Multi-storey Flats and Maisonnettes," by C. A. Belcher; (b) "Commercial Buildings," by E. E. Jacobi.

Central Library, St. Peter's Square, 1, 6.45 p.m. Society of Instrument Technology, Manchester Section. "Transistors," by S. S. Goldburg.

Engineers' Club, Albert Square, 7.15 p.m. Institution of Plant Engineers, Manchester Branch. "Oil Firing of Industrial Boilers," by Dr. H. A. Cheetham.

**Portsmouth.**—Offices of the Ministry of Labour and National Service, Lake Road, 7.30 p.m. A.S.E.E. Portsmouth and District Branch. "Switchgear."

**Worcester.**—Victoria Technical Institute, 7.30 p.m. I.E.E. South Midland Centre, Malvern and District Group. "The Deltic Locomotive," by C. M. Cock.

**Workington.**—College of Further Education, 7 p.m. I.E.E. North Eastern Centre. "The Provision of Adequate Electrical Installations in Buildings—Small Industrial Premises," by J. A. Sharp.

### WEDNESDAY, 11th NOVEMBER

**Birmingham.** — Engineering Centre, Stephenson Place, 7.30 p.m. A.S.E.E. Birmingham Branch. "Protective Equipment for Industrial Plant," by Dr. W. L. Stern.

**Edinburgh.**—Carlton Hotel, North Bridge, 7 p.m. I.E.E. South East Scotland Sub-Centre. "A New Method for Observing the Phenomena of Commutation," by H. J. J. Sketch, P. A. Shaw and R. J. K. Splatt.

**Eltham.**—Eltham Green School, Queenscroft Road, 7.45 p.m. A.S.E.E. South East London Branch. "Marine Propellers," by J. M. Langham.

**Glasgow.**—39, Elmbank Crescent, 7 p.m. British Institution of Radio Engineers, Scottish Section. "The Transistor and its Use in Communication and Control Equipment," by E. Wolfendale.

**Lancaster.**—North Western Electricity Board Demonstration Theatre, North Road, 7.15 p.m. I.E.E. North Lancashire Sub-Centre. "H.V. D.C. Transmission, with special reference to the Cross-Channel Cable," by F. J. Lane.

**Liverpool.**—The Temple, Dale Street, 6 p.m. I.E.E. Mersey and North Wales Centre. Joint meeting with the Liverpool Engineering Society. "Vision and Position—Two Electronic Aids to Marine Navigation," by R. B. Mitchell and C. Powell.

**London.**—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Supply Section. "Generator/Motor Problems in Pumped-Storage Installations," by Dr. J. H. Walker.

I.E.E. London Graduate and Student Section, 2.30 p.m. Visit to the generating plant and brewing process of Arthur Guinness, Son & Co., Ltd.

School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1, 6.30 p.m. British Institution of Radio Engineers, Medical Electronics Group. "Physiological and Acoustical Aspects of Hearing," by Dr. R. P. Gannon.

**Luton.**—College of Technology, Park Square, 8.15 p.m. A.S.E.E. Luton Branch. "The Aims and Workings of the Electrical Association for Women," by Miss A. S. Lockhart.

**Manchester.**—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North Western Electronics and Communications Group. "Aurorae," by Dr. C. B. Watkins.

Café Royal, 6.30 p.m. I.E.S. Manchester Centre. Annual dinner.

**Newcastle-upon-Tyne.** — Royal Station Hotel, 2.30 p.m. Combustion Engineering Association. Discussion on "Factors Affecting the Choice of New Boiler Plant."

Neville Hall, Westgate Road, 6 p.m.

British Institution of Radio Engineers, North Eastern Section. "Electronic Welding Controls," by C. R. Bates.

**Newport (Mon.).**—King's Head Hotel, 6.30 p.m. Newport and District Electric Club. "Hi-Fi and its History," by J. A. Leslie.

**Northampton.**—College of Technology, 7.15 p.m. Northampton and District Electrical Association. "Sound Recording."

**Oxford.**—Southern Electricity Board Service Centre, 37, George Street, 7 p.m. I.E.E. Oxford district meeting. "Modern Coal-Fired Power Station," by A. E. Hawkins.

**Rugby.**—College of Engineering Technology, 6.30 p.m. I.E.E. Rugby Sub-Centre. "The Universe Explored by Radio Astronomy," by F. G. Smith. (Joint meeting with Students' and Graduates' Section.)

**Salisbury.**—S.E.B. Showrooms, 17, New Canal, 6.30 p.m. I.E.E. Southern Centre. "The Planning and Installation of a Television Transmitting Station," by D. B. Weigall.

**Wolverhampton.** — Wolverhampton and Staffordshire College of Technology, Wulfruna Street, 7.15 p.m. British Institution of Radio Engineers, West Midlands Section. "Recent Developments in Semi-Conductor Rectifiers."

**THURSDAY, 12th NOVEMBER**

**Bradford.**—Midland Hotel, 7.30 p.m. A.S.E.E. Bradford and District Branch. Discussion on the I.E.E. Regulations, opened by J. L. Browell.

**Bristol.**—University, 7 p.m. I.E.E. Bristol Graduate and Student Section. Cardiff Exchange Paper. "Distribution Planning in an Urban Area," by O. W. Elias.

**Chelmsford.**—Crompton's Social Hall, 7.30 p.m. Chelmsford Engineering Society. "The Stage and the Engineer," by F. B. Bentham.

**Dundee.**—Queen's College, 7 p.m. I.E.E. North Scotland Sub-Centre. "The Application of Transistors to Line Communication Equipment," by H. T. Prior, D. J. R. Chapman and A. A. M. Whitehead.

**Edinburgh.**—Department of Natural Philosophy, The University, Drummond Street, 7 p.m. British Institution of Radio Engineers, Scottish Section. "The Transistor and its Use in Communication and Control Equipment," by E. Wolfendale.

**Glasgow.**—425/427, Sauchiehall Street, 7.15 p.m. Institution of Plant Engineers, Glasgow Branch. "Nuclear Power," by Comdr. F. A. Walker.

**Liverpool.**—A.S.E.E. Liverpool and District Branch. Works visit to B.I.C.C., Ltd., Prescot.

**London.**—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Utilisation Section. "Submersible Pumping Plant," by H. H. Anderson and W. G. Crawford.

Connaught Rooms, W.C.2, 6.45 for 7.15 p.m. Public Transport Association. Annual dinner.

**Manchester.**—Free Trade Hall, 7 p.m. I.E.S. Manchester Centre. "Lighting for Production," by W. R. Stevens.

College of Technology, Sackville Street, 6.30 p.m. British Institution of Radio Engineers, North Western Section. "Progress in Permanent Magnet Materials," by J. E. Gould.

**Middlesbrough.**—Cleveland Scientific and Technical Institute, Corporation Road, 7.30 p.m. Society of Instrument Technology, Tees-Side Section. "Analogue Computers," by R. E. Hare.

**Nottingham.**—Electricity Centre, Carrington Street, 6 p.m. I.E.S. Nottingham Centre. "Illuminated Ceilings," by W. J. Walpole.

**Swansea.**—South Wales Electricity Board's Showrooms, The Kingsway, 6 p.m. I.E.E. West Wales (Swansea) Sub-Centre. "A Review of Work towards Nuclear Energy from Controlled Thermo-Nuclear Reaction," by D. W. Fry.

**Torquay.**—Electric Hall, Upper Union Street, 3 p.m. I.E.E. South Western Sub-Centre. "Subscriber Trunk Dialling," by D. A. Barron.

**Wimbledon.**—Prince of Wales Hotel, 7.45 p.m. A.S.E.E. South West London Branch. Branch lecturette competition.

**FRIDAY, 13th NOVEMBER**

**Aberdeen.**—Robert Gordon's Technical College, 7.30 p.m. I.E.E. North Scotland Sub-Centre. "The Application of Transistors to Line Communication Equipment," by H. T. Prior, D. J. R. Chapman and A. A. M. Whitehead.

**Birmingham.**—Gosta Green College of Technology, Aston Street, 7 p.m. Society of Instrument Technology, Midland Section. "Ultrasonic Inspection Techniques," by W. B. Emms.

**London.**—Grosvenor House, W.1, 7 p.m. to 2 a.m. Electrical Industries Ball.

Connaught Rooms, W.C.2, 12 noon. National Inspection Council for Electrical Installation Contracting. Annual general meeting, followed by an informal discussion and luncheon.

Caxton Hall, S.W.1, 6.30 p.m. E.P.E.A. Meter Engineers' Technical Group. "Quality Control as Applied to Meter Testing," by H. J. Lovegrove.

Pepys House, 14, Rochester Row, S.W.1, 7 p.m. Junior Institution of Engineers. "Electronic Components," by W. C. C. Ball.

Savoy Hotel, W.C.2. Association of Electrical Machinery Trades. Annual dinner-dance.

**Nottingham.**—Welbeck Hotel, 7 for 7.30 p.m. Institution of Plant Engineers, East Midlands Branch. Dinner-dance.

**Saltburn-by-the-Sea.**—Zetland Hotel, 7.30 p.m. I.E.E. Tees-Side Sub-Centre. Annual dinner and reunion.

**Stone.**—Crown Hotel, 8.30 p.m. I.E.E. North Staffordshire Sub-Centre. Joint dance with Graduate and Student Section.

# *Induction Couplings*

A range of induction couplings providing a controlled output speed or torque from a motor in response to a signal having the power order associated with electronic equipment has been introduced by Pye Electric, Ltd., Lowestoft, Suffolk, a member of the Pye Group. The "TASC"—torque and speed control—unit is inherently a constant torque device and consists of two members rotating independently supported by a stationary fixed structure. The input shaft carries a laminated poled rotor which is positioned within an aluminium alloy torque tube welded to an aluminium boss bolted to the output shaft. The fixed structure consists of a laminated casing ring which surrounds the torque tube at one end and at the other carries the excitation coil which is fixed, to eliminate the need for sliprings. The input member is driven at a constant speed and, when the excitation coil is energised from a d.c. supply, a steady magnetic field is produced which rotates with the poles of the rotor. This induces electrical currents and an associated magnetic field in the torque tube, and the inter-action of the two fields drives the torque tube in the same direction as the poled rotor. The magnitude of the induced torque is directly proportional to the excitation coil current. Larger units in the range have the torque tube mounted on the input shaft and the rotor connected to the driven member.

The coil current can be supplied from a d.c. source through a control rheostat or from an a.c. source using a rectified transformer output, the current regulator being calibrated in torque units. A controller permitting remote control by low power sensing devices makes use of a thyratron current regulator allowing the controlling actuator to be of a low power type. A closed loop system is used to regulate the coil current to give speed control. The output of a current regulator feeding the excitation coil is controlled by a d.c. bias obtained from a difference unit which is supplied with a voltage proportional to the required speed and a voltage proportional to the actual output speed obtained from a tacho-generator. The difference voltage, representing the difference between the required and actual speeds, adjusts the excitation current to correct the output speed by varying the torque available on the output shaft.

The units have a high gain between shaft and control powers, a short magnetic time constant giving a rapid change of torque and a short mechanical time constant for rapid response to changes of torque. There is no connection between the control winding and the output shaft, preventing shaft load conditions reflecting into the control circuits, and the driven shaft can be stalled without causing damage. The range comprises units from ¼ to 10 h.p. having a standard speed range of 20 : 1 controlled to within 3 per cent accuracy. The ¼ and ½ h.p. units are supplied with an integral motor and the prices range from £80 for the integrated ¼ h.p. unit to £175 for the 10 h.p. coupling.

*The shaft-mounted components of a fractional h.p. motor/coupling unit. The poled rotor and its surrounding torque tube are housed within the casing ring which supports the excitation coil*

# GENERATION and DEVELOPMENT

### *Substation Distribution Economy*

At the recently completed Birmingham warehouse of the Halford Cycle Co., Ltd., a single English Electric "Superform" switchboard houses both the Midlands Electricity Board's distribution gear and the outgoing circuits to the warehouse. This compact arrangement has saved building and installation costs by eliminating the necessity to build a separate substation for the M.E.B. gear. The open type substation board, a new English Electric design incorporating a 1,600 A incoming transformer link unit and three outgoing feeders connected to the M.E.B. network, is contained within a sheet steel enclosure. The busbars of this board and the "Superform" board are coupled together, both electrically and mechanically, making the switchboard a composite unit. Doors in the steel enclosure give separate access to the M.E.B. section of the board and Halford's supply is metered within their own section. The contractors were Parker, Winder & Achurch, Ltd., of Birmingham.

### *"Breakdown"*

The B.B.C. item "Breakdown," which was broadcast in February on the Light Programme, proved so popular that a new version has been made and was broadcast in the Children's Hour programme, Home Service, this week. The broadcast told the story of the Eastern Electricity Board's work in restoring supplies after the floods of 1953 and did so through the eyes of Mr. Len Hancox, an engineer employed in the Clacton District of the Suffolk Sub-Area. The part of Mr. Hancox was played, as previously, by Eric Phillips and also taking part were Betty Bascombe and Sheila Manahan. The script was written by Stephen Grenfell and the programme was introduced by a discussion on the Board's work between the Board's information officer (Mr. R. W. Palmer) and Mr. Grenfell.

### *Liverpool Street Lighting Conversion*

The city lighting engineer of Liverpool, Mr. C. C. Smith, in his annual report for 1958-59 refers to the progress of the scheme for the electrification of street lighting which is scheduled to take ten to fifteen years and to cost approximately £600,000. In the first four years 2,508 gas lamps have been replaced by 4,263 electric at a cost of £171,049 and next year, the fifth of the scheme, it is planned to replace a further 650 gas lamps by 1,140 electric lamps. While this conversion scheme is the major task of the immediate future, there are several other important matters to be faced, e.g. improvements in roads where trams have been discontinued, modernisation of the city centre, and alterations and improvements to the department's premises. At present there are nearly 30,000 electric lamp positions in commission and 8,800 gas lamps. The gross expenditure of the department last year was £595,600.

### *Block Storage Heaters*

In view of the fact that the Southern Electricity Board is supporting the efforts of research organisations to design and develop new off-peak appliances for domestic use, the Consultative Council at its meeting at Greenford recently decided to urge the Chancellor of the Exchequer immediately to remove the restriction on the sale of block storage heaters to domestic consumers. The Council is also to ask the Board to have special regard to block storage heaters in its support for the efforts of research organisations.

### *Transport Change-over Deferred*

A recommendation by South Shields transport manager (Mr. J. Crawford) that the town's trolley-bus service should be gradually replaced by motor-buses has been deferred for two years by the Transport Committee.

### *Glasgow Modern Homes Exhibition*

At the recent Modern Homes Exhibition held at the Kelvin Hall, Glasgow, twenty-four electrical manufacturers combined with the South of Scotland Electricity Board to put on a show of electrical appliances.

On the Electricity Board's stand non-stop demonstrations took place, featuring "anniversary themes." These demonstrations combined mannequin shows and a novel competition. A "Go-Electric" juke box contest consisted of a series of tableaux, each depicting some household scene. Each one was described by a few bars of a popular song which gave the tableau its title. As the music stopped, electricity's "Little Boy" followed on with a selling slogan. The last tableau had no music, and visitors were asked, as a competition, to suggest an appropriate song title to fit the scene. Over 25,000 competition forms were handed in. A children's electric cooking competition was also held, Nancy Stewart, of Newton Stewart, winning the girls' first prize and William Peden, of Falkirk, the boys' first prize.

## OVERSEAS

### *The Snowy Mountains Hydro-Electric Scheme*

Snowy T.1, the second of the hydro-electric power stations in the Snowy River hydro-electric and irrigation scheme, was officially opened on 31st October by Sir William Hudson, Commissioner of the Snowy Mountains Hydro-Electric Authority. To date two hydro-electric power stations have been built, the first being the Guthega M.I.B. station in the Snowy-Murray development, which is equipped with two English Electric 30,000 kW water turbine driven generating sets and ancillary equipment. The T.1 station is in the upper Tumut development and accommodates four 110,500 h.p., 375 r.p.m. Francis type English Electric water turbines driving four 80,000 kW generators. The turbines, which are controlled by four 6ft diameter straight flow inlet valves also supplied by the English Electric Co., produce their rated output at a head of 960ft. At the maximum net head of 1,095ft the output from the turbines rises to 134,500 h.p.

*The South of Scotland Electricity Board's stand at the Glasgow Modern Homes Exhibition*

# NEW PATENTS

## Electrical Specifications Recently Published

*The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (3s 6d each including postage) are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2*

**1949**

25889. Boadle, C. D.—Nuclear reactors. 8th October, 1949. (822461.)

**1952**

1034. United Kingdom Atomic Energy Authority.—Gas-discharge apparatus for producing thermonuclear reactions. 14th January, 1953. (822462.)

**1954**

27186. Vredenburg-Inglesby, J. C.—Cathode ray image producing system and apparatus. 20th September, 1955. (Cognate application 4300, 14th February, 1955.) (822166.)

36213. Burndept, Ltd.—Primary electric battery. 14th December, 1955. (822004.)

36263. Reyrolle & Co., Ltd., A.—Solid-insulated joints between insulated high-voltage conductors. 13th December, 1955. (822168.)

36938. British Thomson-Houston Co., Ltd.—Electrical insulating materials. 14th December, 1955. (822701.)

**1955**

728. British Thomson-Houston Co., Ltd.—Preparation of luminescent materials. 10th January, 1956. (822542.)

7158. Automatic Telephone & Electric Co., Ltd.—Control circuits for gas filled cold cathode tubes. 21st February, 1956. (822703.)

8768. English Electric Co., Ltd.—Stator blading of gas turbines. 26th March, 1956. (822170.)

8769. English Electric Co., Ltd.—Induction heating apparatus. 26th March, 1956. (822544.)

9545. English Electric Co., Ltd.—Dynamo-electric machines. 26th March, 1956. (Addition to 748826.) (822006.)

19686. General Electric Co., Ltd.—Manufacture of luminescent screens for cathode-ray tubes. 9th July, 1956. (822160.)

20452. British Insulated Callender's Cables, Ltd.—Manufacture of electric power cables. 12th October, 1956. (822482.)

20583. Siemens Edison Swan, Ltd.—Electronic apparatus. 16th July, 1956. (822548.)

21875. British Insulated Callender's (Submarine Cables), Ltd.—Electric submarine cables. 27th July, 1956. (822008.)

25650. Landis & Gyr, Ltd.—Devices for storing and relaying data received in the form of signal impulses. 27th August, 1956. (822331.)

27119. Thompson Water Tube Boilers, Ltd., J.—Composite tubes in heat exchangers. 22nd September, 1955. (Addition to 804592.) (822705.)

29265. Wolseley Engineering, Ltd., and Banks, C. H.—Electric supply arrangements. 13th November, 1956. (Cognate application 34903, 6th December, 1955.) (822010.)

29544. Philips Electrical Industries, Ltd.—Circuit arrangements comprising a controllable gas-discharge tube, and gas-discharge tubes for use in such circuit arrangements. 17th October, 1955. (822707.)

30659. General Electric Co.—Television receiving apparatus. 26th October, 1955. (822465.)

32340. General Electric Co., Ltd.—Sodium vapour electric-discharge lamps. 29th October, 1956. (Addition to 815893.) (822441.)

34410. Philips Electrical Industries, Ltd.—Electron lenses. 1st December, 1955. (822485.)

35041. Philips Electrical Industries, Ltd. Television receiver circuit arrangements. 6th December, 1955. (822550.)

35742. Morle, C. W. (Philco Corporation).—Cathode-ray tube systems. 13th December, 1955. (822017.)

35910. General Electric Co.—Sealed rectifier units employing semiconductors. 14th December, 1955. (822711.)

36880. General Electric Co.—Cathode-ray tubes for colour television. 23rd December, 1955. (822177.)

37513. Reyrolle & Co., Ltd., A.—High-voltage electric circuit-breakers. 30th December, 1955. (822019.)

**1956**

1035. General Electric Co., Ltd.—Electric winch apparatus. 11th January, 1957. (822413.) 1036. Electric supply arrangements. 11th January, 1957. (822414.)

1241. Licentia Patent-Verwaltungs-G.m.b.H.—Current convertor system. 13th January, 1956. (822021.)

2508. Sangamo Weston, Ltd.—Transformer cores. 25th January, 1956. (822488.)

3539. Mullard Radio Valve Co., Ltd.—Colour television and like systems. 5th November, 1956. (822715.)

3842. Sangamo Weston, Ltd.—Photo-electric exposure meters. 7th February, 1956. (822023.)

4797. Patent-Treuhand-Gesellschaft für Elektrische Gluhlampen.—Electric low-pressure discharge tubes, more particularly fluorescent lamps. 15th February, 1956. (822553.)

5334. Vyzkumny A Zkusebni Letecky Ustav.—Electromagnetic transducer. 21st February, 1956. (822489.)

5362. General Electric Co.—Electronic circuit arrangements. 21st February, 1956. (822554.)

5832. General Electric Co.—Electrical insulating materials based on plasticised and stabilised polymers or copolymers of vinyl halides. 24th February, 1956. (822024.)

6181. General Electric Co.—Electron gun assemblies. 28th February, 1956. (822556.)

8326. General Electric Co., Ltd.—Cathode-ray tubes. 16th March, 1956. (822443.)

8993. Evershed & Vignoles, Ltd.—Electrical remote indicating and repeating systems. 18th March, 1957. (822719.)

9408. Rank Precision Industries, Ltd., formerly British Optical & Precision Engineers, Ltd.—Electronic gauging systems. 22nd March, 1957. (822182.)

9668. General Electric Co.—Reactors. 28th March, 1956. (822032.)

9769. Siemens-Schuckertwerke A.G.—Processes for the production of dry rectifier elements. 28th March, 1956. (822721.)

9861. General Electric Co.—Ionisation chambers. 29th March, 1956. (822560.)

12064. Falk, Stadelmann & Co., Ltd.—Dolly-operated electric switch mechanism. 23rd April, 1957. (822235.) 12065. Composite contact and terminal post for incorporation in electric switch mechanism. 23rd April, 1957. (822236.) 12067. Fixing means for an electric switch or socket cover plate. 23rd April, 1957. (822183.)

13253. Siemens-Schuckertwerke A.G.—Arrangement for adjustment of stage lighting. 30th April, 1956. (822036.)

17228. Sound Diffusion (Autothermatic), Ltd.—Electrically operated fire detection apparatus. 10th May, 1957. (822470.)

17395. Standard Telephones & Cables, Ltd.—Electrical switching circuits. 31st May, 1957. (822297.)

17666. Thorn Electrical Industries, Ltd.—Electric amplifiers and modulators and the like. 7th June, 1957. (822471.)

18424. Siemens Edison Swan, Ltd.—Automatic switching systems. 12th June, 1957. (822409.) 18425. Automatic telephone and like exchange systems. 12th June, 1957. (822410.)

23170. General Electric Co., Ltd., and Puckette, C. C.—Telephone dials. 26th July, 1957. (822300.)

24219. Electricité de France.—Combustion chambers which burn pulverised fuels. 7th August, 1957. (Addition to 753097.) (822359.)

25165. Broniewski, B.—Methods of and apparatus for regulating the speed and the torque of a slip-ring asynchronous machine. 17th August, 1956. (822044.)

25379. Rheostatic Co., Ltd.—Temperature control systems. 20th August, 1956. (822568.)

25674. Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz.—Arrangement for regulating the frequency of rotary convertors. 22nd August, 1956. (822569.)

25855. General Electric Co., Ltd.—Methods of manufacturing waveguides and waveguide components. 23rd August, 1957. (Cognate application 25857, 23rd August, 1956.) (822274.)

25856. General Electric Co., Ltd., Cole, W. P., and Walsh, A. S.—Waveguide arrangements. 25th November, 1957. (822275.)

27775. Self-Changing Gears, Ltd.—Means for the electrical control of change-speed gearing. 27th August, 1957. (822445.)

27987. Lucas (Industries), Ltd., J.—Retractive electric switch. 5th September, 1957. (822196.)

28358. British Thomson-Houston Co., Ltd.—Automatic control of the delivery of conveyors. 17th September, 1957. (822743.)

28475. Mallory & Co., Inc., P. R.—Electric circuit assembly. 18th September, 1956. (822623.)

29897. Frako Kondensatoren und Apparatebau G.m.b.H.—Interruptor-type control means for d.c. motors. 1st October, 1956. (822303.)

29924. General Electric Co., Ltd.—Nuclear reactors. 26th September, 1957. (822415.)

30307. General Electric Co., Ltd.—Finger plates for telephone dials. 4th October, 1957. (822746.)

31368. Landis & Gyr A.G.—Reverse-motion arresting and signalling device for electric measuring instruments, more especially electricity meters. 15th October, 1956. (822626.)

32133. Egyesült Izzolampa es Villa-Mossagi R.T.—Production of hollow bodies, such as the bulbs of cathode-ray tubes. 22nd October, 1956. (822627.)

33631. Automatic Telephone & Electric Co., Ltd.—Telephone systems. 15th October, 1957. (822306.)

33860. Lion, K. S.—Electric transducer. 6th November, 1956. (822574.)

38561. British Thomson-Houston Co., Ltd.—Electrical insulating material. 17th December, 1957. (822507.)

39136. Distillers Co., Ltd.—Electrical apparatus. 19th December, 1957. (822201.)

39335. Sachs, E., Sachs jun. E. and Sachs, M. (trading as Sachs, E., Spezialfabrik Elektrischer Lötkolben und Lötbäden, Komm-Ges. E.).—Heating heads for electric soldering irons for precision work. 27th December, 1956. (822311.)

**1957**

360. Scott & Electromotors, Ltd., L.—Deep bar rotor induction motors. 3rd January, 1957. (822313.)

772. Pye, Ltd.—Television cameras. 11th December, 1957. (822071.)

[*Continued on page* 631

## NEW PATENTS (*continued*)

960. Westinghouse Electric International Co.—Electric incandescent lamp envelopes. 10th January, 1957. (822757.)

1794. Mullard, Ltd.—Logical circuits. 31st December, 1957. (822508.)

2617. British Thomson-Houston Co., Ltd.—Impregnating and electrical insulation testing apparatus. 15th January, 1958. (822203.)

2641. Sylvania Electric Products, Inc.—Methods for coating fluorescent lamps. 24th January, 1957. (822647.)

3126. Philips Electrical Industries, Ltd.—Contact bars comprising a series of insulating blocks having contact members. 29th January, 1957. (822509.)

4072. English Electric Valve Co., Ltd.—Means for preventing the deleterious effects of X-rays in resonant cavity magnetrons. 4th October, 1957. (822583.)

4112. British Thomson-Houston Co., Ltd.—Low-pressure electric-discharge lamps. 28th March, 1958. (822510.)

5005. Oxley, R. F.—Variable capacity rotary condensers. 3rd February, 1958. (822316.)

5265. Brush Electrical Engineering Co., Ltd.—Control systems for induction motors. 17th February, 1958. (822513.)

6882. Telephone Manufacturing Co., Ltd.—Electromagnetic relays. 24th February, 1958. (822652.)

8636. British Thomson-Houston Co., Ltd.—Switch control system for electric battery charging circuits. 14th March, 1958. (822521.)

9048. Rolls-Royce, Ltd.—Electrical systems for vehicles. 18th March, 1958. (822522.)

9135. Brunsviga Maschinenwerke A.G.—Electrical arrangement for analysing sums of money and the like according to species. 20th March, 1957. (822761.)

9524. Marconi's Wireless Telegraph Co., Ltd.—Electron-discharge device circuit arrangements. 23rd January, 1958. (Addition to 783124.) (822209.)

9568. Mayo, C. G., Wigan, E. R., & Jones, R. E.—Voltage limiting apparatus. 20th June, 1958. (822762.)

9813. Automatic Telephone & Electric Co., Ltd.—Telephone systems. 10th February, 1958. (822319.)

10388. General Electric Co., Ltd.—Instruments for making magnetic measurements. 14th March, 1958. (822210.)

11476. Automatic Telephone & Electric Co., Ltd.—Electrical connectors. 23rd April, 1958. (822764.)

11729. Silvertown Rubber Co., Ltd., and Puffett, W. W.—Negative electrodes of electrolytic cells. 9th April, 1958. (821676.)

11936. General Electric Co., Ltd.—Fluorescent material. 18th April, 1958. (821677.)

12272. Siemens-Schuckertwerke A.G.—Transistor circuit arrangements. 15th April, 1957. (821678.)

12374. National Research Development Corporation.—Electrical pulse circuits. 14th April, 1958. (821679.)

13357. English Electric Valve Co., Ltd. Magnetrons. 7th February, 1958. (822766.)

14220. National Research Development Corporation.—Electrical batteries. 25th April, 1958. (822086.)

15710. Sperry Rand Corporation.—Magnetic switching system. 17th May, 1957. (822660.)

16284. Brown, Boveri & Cie A.G.—Voltage regulation arrangement for contact convertors. 22nd May, 1957. (822530.)

16918. General Electric Co., Ltd.—Electric lighting fittings. 25th February, 1958. (822661.)

17206. Philips Electrical Industries, Ltd.—Methods of manufacturing ferromagnetic ferrite bodies from ferromagnetic ferrite materials. 30th May, 1957. (822097.)

17360. Standard Telephones & Cables, Ltd.—Resonant unit for filters. 31st May, 1957. (821747.)

17514. Protona Produktionsgesellschaft für Elektro-Akustische Geraete G.m.b.H.—Speed regulation of electric motors. 3rd June, 1957. (822398.)

17707. Western Electric Co., Inc.—Acoustic signalling means, particularly for telephone sets. 4th June, 1957. (822098.)

17982. Allen Electric & Equipment Co.—Apparatus for measuring the cam angle or dwell time of switch contacts. 6th June, 1957. (822099.)

18520. Westinghouse Electric International Co.—Electric control switching systems for controlling the supply of power to a load. 12th June, 1957. (821750.)

19352. General Electric Co., Ltd.—Electric circuit arrangements for the control of stage lighting and analogous uses. 19th June, 1958. (822211.)

20378. Lodge-Cottrell, Ltd.—Electrostatic precipitators. 23rd May, 1958. (821752.)

20883. Kokusai Denshin Denwa Kabushiki Kaisha.—Storage system for electric signal or signals. 2nd July, 1957. (822212.)

20938. M-O Valve Co., Ltd.—Electric discharge devices. 27th June, 1958. (Addition to 716372.) (821753.)

21183. General Electric Co.—Apparatus for positioning an object with respect to a reference datum. 4th July, 1957. (822102.)

22328. Marconi's Wireless Telegraph Co., Ltd.—Electrical resistances. 18th March, 1958. (821754.)

22690. Siemens & Halske A.G.—Circuit arrangements for indicating single lines out of groups of lines having a common designation number, for example P.B.X. groups in telecommunication switching systems. 17th July, 1957. (822104.)

23297. Du Pont de Nemours & Co., E.I.—Apparatus for the conversion of electromagnetic to mechanical energy. 23rd July, 1957. (822107.)

26005. Vogt, H.—Porous electrodes for electric accumulators and a method for the production thereof. 16th August, 1957. (822250.)

26548. Philips Electrical Industries, Ltd.—Circuit arrangements for demodulating and subsequently amplifying television signals modulated on to a carrier. 22nd August, 1957. (821908.)

26786. Tokyo Tsushin Kogyo Kabushiki Kaisha.—Method of etching the surface of a semiconductor or an electric device comprising said semiconductor. 26th August, 1957. (822251.)

26870. Collins Radio Co.—Linear tuning curve inductor. 26th August, 1957. (822110.)

28894. Hydraulik G.m.b.H.—Cable sheathing press. 13th September, 1957. (821909.)

30117. Siemens-Schuckertwerke A.G.—Electric contact convertors. 25th September, 1957. (822117.)

35275. Protona Produktionsgesellschaft für Elektro-Akustische Gerate G.m.b.H.—Centrifugally operated electric contact breakers. 12th November, 1957. (821791.)

38842. Standard Telephones & Cables, Ltd.—Arrangements operable on pilot current failure in telecommunication transmission systems. 13th December, 1957. (821794.)

**1958**

676. Morgan Crucible Co., Ltd.—Shields for nuclear reactors. 7th January, 1958. (Addition to 797692.) (821915.)

1575. Hazeltine Corporation.—Synchronous detector system for a colour television receiver. 16th January, 1958. (821800.)

3243. Siemens-Reiniger-Werke A.G.—High voltage supply rectifier units. 31st January, 1958. (821803.)

15654. Mullard, Ltd.—Pulse generating circuits. 15th May, 1958. (821814.)

16737. Siemens-Planiawerke Aktiengesellschaft für Kohlefabrikate.—Arrangements for regulating the supply of current to high current resistance furnaces to be fed with alternating current. 23rd May, 1958. (821816.)

20832. Standard Telephones & Cables, Ltd.—Spark gap apparatus. 30th June, 1958. (822000.)

## TRADE MARK APPLICATIONS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 21st November:—

**MotoMaid.** No. 787,781. Class 7. Electric motors incorporating flexible shaft drive, all for household use.—Jones & Stevens, Ltd., Long Lane, Littlemore, Oxford.

**Ersa** (design). No. 782,250. Class 9. Electric soldering appliances and parts.—Ernst Sachs Erste Spezialfabrik Electrischer Lotkolben und Lotbader K.G., Wertheim-am-Main, Germany. Address for service, c/o Page, White & Farrer, 27, Chancery Lane, London, W.C.2.

**Painton** (design). No. B785,910. Class 9. Switches, terminals, resistors, plugs and sockets therefor, and condensers, all being electric; and potentiometers, valve holders, radio frequency chokes, parts of electronic waveguides and of electric strain gauges; radio attenuators and faders, etc.—Painton & Co., Ltd., Bembridge Drive, Kingsthorpe, Northampton.

**Aldis Digilite.** No. B785,994. Class 9. Electrical indicating apparatus.—Aldis Brothers, Ltd., Priory Works, Sarehole Road, Hall Green, Birmingham, 28.

**Crabtree.** No. 787,891. Class 9. Fittings for electric wiring systems; electrical apparatus for use in starting and controlling the operation of electric motors; contact-operated electrical devices for indicating predetermined time intervals; limit switches, fuses, circuit-breakers, push-button switches, distribution boards and distribution boxes.—J. A. Crabtree & Co., Ltd., Lincoln Works, Lincoln Road, Walsall, Staffs.

**Isodraulic.** No. 789,136. Class 9. Valves operated automatically by electric current control, by solenoid and by temperature or other changes in physical condition.—Iso-Speedic Co., Ltd., Charles Street, Warwick.

**Predicta.** No. 790,709. Class 9. Radio receivers, television receivers and phonographs, and parts.—Philco Corporation, Philadelphia, Penn., U.S.A. Address for service, c/o Stevens, Langner, Parry & Rollinson, 5 to 9, Quality Court, Chancery Lane, London, W.C.2.

**Corruleadin.** No. 790,834. Class 9. Covered electric wires and electric cables; and electric conduits.—Wandleside Cable Works, Ltd., 106, Garratt Lane, Wandsworth, London, S.W.18.

**Execaphon.** No. 790,876. Class 9. Sound amplifiers for telephones.—H. F. Munro, 103, Sydenham Park Road, London, S.E.26, and P. F. Day, 70, Sydenham Park Road, London, S.E.26.

**Sigmette.** No. 791,044. Class 9. Electric welding apparatus.—Union-Carbide Corporation, New York, U.S.A. Address for service, c/o Marks & Clerk, 57 and 58, Lincoln's Inn Fields, London, W.C.2.

**Paxitron.** No. 791,206. Class 9. Electrical apparatus and instruments, etc.—C. Braun and W. Braun, trading as Carl Braun Camera-Werk, Nürnberg, Germany. Address for service, c/o Frank B. Dehn & Co., Kingsway House, 103, Kingsway, London, W.C.2.

**Tabulair.** No. B789,526. Class 11. Domestic electric space heating apparatus.—Spiral Tube & Components Co., Ltd., Osmaston Park Road, Derby.

# CONTRACT INFORMATION

## Accepted Tenders and Prospective Electrical Work

### CONTRACTS OPEN

*Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses*

**Australia.**—Brisbane Electricity Department. 18th December. Medium and l.v. air-break switchgear for Tennyson power station. (E.S.B. 25440/59. Ten/42948.)*

Postmaster General's Department, Melbourne. 15th December. Telephone protective apparatus. (E.S.B. 25606/59. Ten/42951.)*

**Hereford.**—City Council. 16th November. Electrical installations in 156 houses. (See this issue.)

**India.**—National Coal Development Corporation, Ltd., Ranchi. 28th November. Insulated cable, oil circuit-breakers, switchboard and one 250 kVA transformer. (E.S.B. 25487/59 and 25646/59. Ten/42970.)*

Director General of Supplies and Disposals, New Delhi. 19th November. Electrically driven pump sets. (E.S.B. 25833/59. Ten/43045.)*

**Iran.**—Iran State Railways, Teheran. 1st December. 2,000 1·5 V batteries. (E.S.B. 25342/59. Ten/42944.)*

Ministry of Posts and Telegraphs, Teheran. 14th December. Telegraph and telephone equipment. (E.S.B. 25404/59. Ten/42919.)*

**Kuwait.**—Electricity, Water and Gas Department. 29th November. 300 domestic refrigerators. (E.S.B. 25400/59. Ten/42932.)*

**London.**—Ministry of Transport. 7th December. Lighting equipment for section of the London-Fishguard road. (See this issue.)

**Londonderry.**—County Education Committee. 24th November. Electrical installation in Killure Primary School. County education architect, Manor House, Coleraine, Northern Ireland.

**Pakistan.**—Water and Power Development Authority, Lahore. 18th November. Switchgear. (E.S.B. 25918/9/59. Ten/43073/4.)*

**Peterborough.**—Corporation. 28th November. Electrical installations in shops, flats and maisonnettes. (See this issue.)

**Rhodesia and Nyasaland.**—Federal Tender Board, Salisbury. 27th November. Ultrasonic machine for the non-destructive testing of metals and concrete. (E.S.B. 25272/59. Ten/42920.)*

Bulawayo Electricity Department. 2nd December. 11 kV, 250 MVA switchgear, battery and charger. (E.S.B. 25691/59. Ten/42995.)* Meter testing equipment. (E.S.B. 25692/59. Ten/42994.)*

**Stockton-on-Tees.**—Corporation. 16th November. Electrical work in 134 houses at Hardwick. Borough architect, 28, The Square.

**Sudan.**—Controller of Stores, Ministry of Works, Khartoum. 12th December. Ceiling and table fans. (E.S.B. 25317/59. Ten/42926.)*

Stores Department, Sudan Railways, Atbara. 26th November. Dispersive reflectors and dustproof attachments for wagon shop. (E.S.B. 25684/59. Ten/43002.)* Propeller fans and speed regulators for wagon paint shop. (E.S.B. 25319/59. Ten/43035.)*

**Trinidad.**—Trinidad and Tobago Electricity Commission. 30th November. Line hardware equipment, including conductors and wooden poles, and cable, switchboard, fluorescent lighting fittings, insulators, fuse connectors and transformer oil. (E.S.B. 25595/59. Ten/42969.)*

* Specifications may be inspected at the Export Services Branch, Board of Trade, Lacon House, Theobald's Road, London, W.C.1 (Chancery 4411; extension 769).

**Uruguay.**—Usinas Eléctricas y los Téléfonos del Estado, Montevideo. 11th December. Black and yellow insulating tape. (E.S.B. 25654/59. Ten/42982.)* 15th December. Component parts for public lighting. (E.S.B. 25616/59. Ten/42993.)* Transformers ranging from 5 kVA to 200 kVA. (E.S.B. 25647/59. Ten/42992.)*

### ORDERS PLACED

**Acton.**—Borough Council Works Committee. Conversion of street lighting on Western Avenue, between Gipsy Corner and the Savoy Circus, from gas to electricity (£3,950).—Atlas Lighting.

**Durham.**—County Education Committee. Electrical work at schools: Low Grange County Infants' School (£2,751).—John Calvert. Consett Technical College (£1,500).—G. A. Walton. Gilesgate Modern School (£7,872) and West Cornforth County School (£234).—North of England Engineering & Electrical Co. Stanley R.C. (Aided) School (£1,152).—T. Mitchelson (Electrical).

**Havant and Waterloo.**—U.D.C. Sixty-three group "A" steel columns, 418 group "B" steel columns and 59 swan neck brackets and control boxes for street lighting.—Abacus Engineering.

**Peterborough.**—Corporation Joint Education Board. Electrical installation work in the extension to the engineering wing, Technical College (£2,718).—D. J. Spire & Co.

**Sheffield.** — Regional Hospital Board. Recommended. Installation of a bed-passenger lift in the Victoria ward block, Nether Edge Hospital (£3,537).—Evans Lifts.

### WORK IN PROSPECT

*Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors*

**Bath.** — Laboratories, classrooms and assembly hall, St. Christopher's Preparatory School (£70,000); Snailum & Le Fevre, architects, 18, Brook Street.

**Bedlington.** — New premises for the Y.M.C.A. (£20,000); S. W. Milburn & Partners, architects, 9, Esplanade, Sunderland.

**Birmingham.**—Factory, Garretts Green (£300,000), for C. Kunzle, Ltd., Five Ways; C. Bryant & Son, Ltd., builders, 65, Whitmore Road, Edgbaston.

**Blackpool.**—Church and presbytery, Common Edge Road; Sandy & Norris, architects, 139, Newport Road, Stafford.

**Bristol.**—Old persons' home, Henbury, and houses (136), Kennard Road, St. George; planning officer, Cabot House, Deanery Road.

**Burnley.**—Erection of St. Mark's Church, Rossendale Road; Taylor Young & Partners, architects, 195, Oxford Road, Manchester, 13.

**Cheltenham.**—Flats (28), Park House, Park Place; Span Developments, Ltd., 18, Dryden Court, Parkleys, Ham, Surrey.

Extensions, St. Mary's College; Healing & Overbury, architects, Rodney Lodge.

Flats (100), Sun Street and Queen Street; borough engineer, Municipal Offices.

**Cumberland.**—School, Aspatria (£153,000); J. H. Haughan, county architect, Portland Square, Carlisle.

**Doncaster.**—Two blocks of four-storey flats, central area redevelopment; borough architect, 15, South Parade.

**Durham.**—R.C. school (£44,000); A. Rossi, architect, Melbourne Street, Consett.

**Eastbourne.**—Extensions; Armour Laboratories, Ltd., Brampton Road.

**Eccles.**—Church and presbytery, Aldred Street; Walter Stirrup & Son, architects, 14, Richmond Terrace, Blackburn.

Four ten-storey blocks of flats, Cawdor Street; borough engineer.

**Eston (Yorks.).**—Offices for the U.D.C. (£110,000); Charles Tennet, Ltd., contractors, Church Road, Stockton.

**Exeter.**—First instalment of Exeter Technical College, Hele Road; city architect, Municipal Offices.

**Gateshead.**—Factory additions, Team Valley Trading Estate, for Reed Millican & Co.; Arthur & Kirkup, architects, 13, Swinburne Street.

Secondary modern school, Elgin Road; borough engineer.

Development of the Leam Lane estate, including 270 houses and 20 four-storey blocks of maisonnettes, for the North Eastern Housing Association, 5, Windsor Terrace, Newcastle-on-Tyne.

**Goole.**—Blocks of flats and maisonnettes, North Street and Burlington Crescent; borough surveyor.

**Hastings.**—Houses (100), Sedlescombe Road North; Prowting Estates, Ltd., 127, High Street, Ruislip.

**Haverhill.**—Retail stores, High Street, for F. W. Woolworth & Co.; H. Winborne, chief architect, Woolworth House, Marylebone Road, London, N.W.

**Jarrow.**—Factory additions, Bede trading estate, for Frys Diecasting, Ltd.; Gray & Partner, architects, Camden Street, North Shields.

**London.**—Office block, 50/51, Russell Square, Bloomsbury; Gerald Shenstone & Partners, architects, 34, Bloomsbury Way, W.C.1.

**Luton.**—Central library and indoor swimming baths; director of housing, Town Hall.

**Newcastle-on-Tyne.**—Additions to Ministry of Pensions and National Insurance headquarters; J. R. Rutherford & Sons, contractors, 123, Jesmond Road.

**Nottingham.**—Civic theatre, East Circus Street; E. W. S. Martin, estates surveyor, Guildhall.

**Port Talbot.**—Houses (70), Sandfields; borough engineer, Municipal Buildings.

**Saffron Walden.**—Printing works, Thaxted Road industrial site; Universal Tape Printing Co., Ltd., Castle Works.

**Scarborough.**—Shops, Westborough, for Venture Property & Development Co.; Shingler & Risdon, architects, 47, Bedford Row, London, W.C.1.

Estate developments off Filey Road; Wilkinson, Smith & Brittlebank, architects, Martins Bank Chambers.

**Scunthorpe.** — Civic centre, Central Gardens; borough surveyor.

**Stanley (Co. Durham).**—Houses (192), and three shops; U.D.C. surveyor.

**Stockton-on-Tees.**—Provision of kitchen and dining facilities at Newtown Infants' school, Portrack Primary school, St. John's C.E. Controlled school and St. Joseph's R.C. Primary school; borough architect, 28, The Square.

**Stockton-on-Tees.**—R.C. church and presbytery; T. A. Crawford, architect, 80, Borough Road, Middlesbrough.

**Sunderland.**—Comprehensive school, Seaburn; borough architect, Grange House, Stockton Road.

New premises for Sixty Minute Cleaners, Ltd.; North Eastern Trading Estates, Ltd., Team Valley trading estate, Gateshead.

**Swindon.**—Factory (£400,000), Industrial estate; Square D, Ltd., 96, Aldersgate Street, London, E.C.1.